Green Label Product
Printers and Copiers
(TGL–124–20)

Approved on
13 November 2020

Thailand Environment Institute (TEI)
16/151 Muang Thong Thani, Bond Street, Bangpood, Pakkred,
Nonthaburi 11120 Thailand
Phone: 0-2503-3333 ext. 521, 522, 523, 524, 525, 526, 527
Fax: 0-2504-4826-8
Website: http://www.tei.or.th/greenlabel/

Table of Contents

Printers and Copiers
TGL-124-20

1. Rationale

Printers and copiers are devices that use electricity for printing and copying of documents. Most office applications, if they are open without use, it will cause the waste of electrical energy and generate heat in the office. In addition, chemicals contained in the toner can be released into the atmosphere during printing or copying, which affects the health of regular users and is a concern for the environment. Also, most printers and copiers make quite loud noises that can cause noise pollution, including when printing or copying documents, they may emit pollutants such as styrene, ozone, volatile organic compounds and dust etc. In addition, components and equipment used together. For example, cartridges also contain heavy metals including mercury, lead, cadmium and hexavalent chromium. If it is not properly disposed of, it may contaminate the environment and harm to living things.

To specify that the printer and the copier certified a green label must be able to switch the Mode to Energy Saving Mode, Sleep mode and must pass the test for the concentration of dust and various chemicals released into the atmosphere including pass the noise level test to make it energy-saving and safe for users. In addition, the present of a plastic symbol supports the recycling of resources. It is also not a burden to dispose of after use.

2.Scope

The green label requirement ***covers printers*** product-specific generates text images on printed material that can be obtained from single user or networked computers or other input devices (such as digital cameras), with the printer powered by a comprehensive power source and cover to a multifunction printer with the main function of printing and copying. ***Copiers*** cover specific to dry copiers of all sizes, multifunction copier either copier in black and white or color with the operation of images, which is operated by manual and / or automatically. However, copiers without photoreceptor drum will not be included.

3. Definition

3.1 **Printer** refer to devices that display images, texts and graphics with printing

3.2 **Copiers** refer to a machine for copying documents with two systems of working technologies such as analog and digital system. By using an optical system, it is a reflection of the image and an electric charge that absorbs the toner onto the receiving template. Or the use of optical systems causes images and light to be reflected into a circuit to convert the image signal into an electrical signal. The electrical signal then creates an electric charge that absorbs the toner into the image receiving template and is printed on the support in the original format of the original.

3.3 **Digital copier** refers to a device used for copying documents using optical system to reflect images and light into the circuit to convert the image signal into electrical signal. The electric signal is then converted into an electric charge to generate electricity for

absorb the toner into the receiving template. And printed on the support in the original format of the original

3.4 Multifunction copiers refer to device that is used to copy images from the original documents on the basis of static electricity. They are primarily used for copying documents, but they can print on paper or send and receive data just like a printer or fax machine or a scanning machine using toner system.

3.5 Image receiving template refers to the image receiver, which absorbs toner using the static electricity, the shape of a drum or other form.

3.6 Double-side copying or duplex unit refers to printing one sheet of paper on both sides.

3.7 Multifunction printer; MFP refers a product that performs the core functions of a Printer, Scanner. An MFD may have a physically integrated form factor, or it may consist of a combination of functionally integrated components. MFD copy functionality is considered to be distinct from single-sheet convenience copying functionality sometimes offered by fax machines. This definition is intended to cover products marketed as MFDs, and "multi-function products" (MFPs).[1]

3.8 Off-Mode refers to the device turned off or automatically turned off while not in use but still plugged into the device

3.9 Total VOC refer to all organic substances and volatile organic compounds dissolved in the n-hexane range and n-hexadecane during gas chromatographic separation on non-polar column.[2]

3.10 Dust refer to total suspended particulate Solid particles and aerosol droplets scatter in the air. Some of these airborne particles are large. And black until you see soot and smoke But some are so small that they cannot be seen by the naked eye.[3]

3.11 Letter for declaration of compliance refers to a certification document issued by the applicant or the manufacturer that it meets the special requirements specified in the green label requirements for the applied product.

3.12 Certificate refers to documents issued by the certification body, which the accreditation body must be accredited by the accreditation body that listed in the IAF (international accreditation forum)

3.13 Legally Authorized person refers the person authorize to signed under Civil and Commerce Law

4. General requirements

4.1 Products must be certified or tested for safety in accordance with industrial standards. TIS 1561[4] or IEC 60950 part 1[5] or EN 60950-1[6] or IEC 62368-1[7]

1 Eco Mark No.155 "Imaging Equipment such as Copiers, Printers, etc. Version 1.4
2 EC-24-17 Printers, copiers, faxes and consumables (The New Zealand Ecolabelling Trust)
file:///C:/Users/tanomlap/Downloads/_assets_Specifications_2017-08-02-EC-24-17.pdf
3 Office of Air Quality and Noise Management, Pollution Control Department http://aqnis.pcd.go.th/basic/pollution_pm.htm
4 TIS.1561: Information technology equipment - safety - part 1: general requirements
5 IEC 60950 part 1: Information technology equipment -Safety - P.1: General requirements
6 EN 60950-1: Information technology equipment - Safety - P.1: General requirements
7 IEC 62368-1:2018 Audio/video, information and communication technology equipment - Part 1: Safety requirements

Verification Method

The applicant must present the electrical safety certificate or test results according to the industrial standard TIS 1561 or IEC 60950 part 1 or EN 60950-1 or IEC 62368-1

4.2 Products must be certified or passed the Electromagnetic compatibility: EMC test according to industry product standards TIS 1956[8] or CISPR22[9] or EN 55032[10]

Verification Method

The applicant must present the results of the electromagnetic compatibility test in accordance with the Industrial Standard No. TIS 1956 or the CISPR22 or EN 55032

Note 1) In the case of the applied model name does not match the EMC test results
The applicant must provide documentation and evidence indicating the association of the code or the factory-made model name with the trade name of the applied model product. Indicating that the code or the factory-made model name is consistent.

2) If the applicant requires to submit the test report under other **test methods equivalent to the method specified in the green label requirements**, the applicant must submit the following documents attached to the test results as following
- Signed documents from the applied product testing laboratory that the test method is equivalent to the test method standard specified in the green label specification
- Documents showing the comparison between the test methods used by the applicant to test the product and the test methods specified in the green label requirements.

4.3 Production, transportation and waste disposal from the production process must comply with government laws and regulations or be a factory certified by the ISO 14001[11].

Verification Method

The applicant must submit one of the following evidence.
1. Permits or evidence that the production, transportation and the waste disposal from the production process accordance with the government laws and regulations.
2. ISO 14001 environmental management system certificate of the manufacturer's factory.

Note: In case of imported products. The manufacturer's factory must have certified ISO 14001 environmental management system

5. Environmental Requirements

5.1 Power Consumption

8 TIS 1956: Information technology equipment: radio disturbance limits
9 CISPR 22: Information technology Equipment-Radio Disturbance Characteristics-Limits and methods of measurement
10 EN 55032: Electromagnetic compatibility of multimedia equipment - Emission requirements
https://www.nwemc.com/news/2014/09/04/en-550322012-required-starting-march-5-2017
11 ISO 14001: Environmental Management System

5.1.1 Typical Energy Consumption

The maximum allowable typical energy consumption value (TEC_{MZul}) depends on the page throughput (S_M). The calculation of the maximum TEC value is defined as the following table.

Table 1-1 Maximum typical energy consumption values (TEC_{MZul}) for monochrome printers.

Page throughput	TEC_{MZul} [kWh/week]
$S_M \leq 25$	$0,95 + 15/100000 \times S_M$
$S_M > 25$	$0,35 + 105/100000 \times S_M^2$

Table 1-2 Maximum typical energy consumption values (TEC_{MZul}) for color printers.

Page throughput	TEC_{MZul} [kWh/week]
$S_M \leq 25$	$1,05 + 665/100000 \times S_M^{1,4}$
$S_M > 25$	$0,85 + 145/100000 \times S_M^2$

Table 1-3 Maximum typical energy consumption values (TEC_{MZul}) for monochrome multifunction devices.

Page throughput	TEC_{MZul} [kWh/week]
$S_M \leq 25$	$1,35 + 30/100000 \times S_M^{1,8}$
$S_M > 25$	$0,8 + 105/100000 \times S_M^2$

Table 1-4 Maximum typical energy consumption values (TEC_{MZul}) for color multifunction devices.

Page throughput	TEC_{MZul} [kWh/week]
$S_M \leq 25$	$1,3 + 650/100000 \times S_M^{1,3}$
$S_M > 25$	$0,9 + 145/100000 \times S_M^2$

Note: The multifunction printing device is All in one printer that combines the functionality of multiple devices in the same package, including printer, copier, fax machines and scanners, etc. There may be different components for each model.

Verification Method

The applicant must submit one of the following evidence

1. Electricity level test results of printing equipment under various conditions tested according to the latest update of International energy star program requirements for imaging equipment method.
2. Other documents to ensure that the applied model product is certified with the International energy star program requirements for imaging equipment, such as the Blue Angle; The German ecolabel, Japan, etc.

5.1.2 Sleep Mode Power Consumption

The device must not have more than 2 watts of power consumption, except for devices with a wireless access point, must not have more than 3 watts of power consumption.

5.1.3 Off-Mode Power Consumption

The device turned off or automatically turned off while not in use but still plugged into the device, the device must not exceed 0.4 watts of power consumption.

Verification Method

The applicant must submit evidence of energy consumption level test result of printing equipment under the conditions as described in 5.1.2 and 5.1.3 by testing in accordance with the latest updated method of international energy star program requirements for imaging equipment or documents to ensure that the applied product model have certified by international energy star program requirements such as Blue Angle; The German ecolabel, Japan etc.

5.2 Emission rate: Dust, Ozone, Total Volatile Organic Compounds (TVOC), Styrene and Benzene while using the machine must not exceed the specified value as shown in Table 2[12]

Table 2 Emission rates while using

Type o pollutant			Emission rate (Milligram per hour)	
			Monochrome	Color
Dust			≤ 4.0	≤ 4.0
Ozone			≤ 1.5	≤ 3.0
TVOC	print phase		≤ 10	≤ 18
	Ready phase	Floor-mounted	≤ 2.0	≤ 2.0
		Table top	≤ 1.0	≤ 1.0
Styrene			≤ 1.0	≤ 1.8
Benzene			≤ 0.05	≤ 0.05

Note: Test method based on Appendix 2 of Blue Angle The German ecolabel criteria DE-UZ-205[13]

Verification Method

The applicant must submit the emission rate test result according table 2 by test method based on Appendix 2 of Blue Angle; The German ecolabel criteria DE-UZ-205

5.3 The noise level of the appliance during operation must be within the determined range. The calculation using the formula shown in Table 3. But A-weighted sound power level (L_{WAd}) the value must not exceed 75 decibels (dBA).

Table 3 Noise Emissions while operation

A-weighted sound power level (L_{WAd})	
Monochrome	Color
$\leq 47+15 \times \log(S_M+10)$	$\leq 47+15 \times \log(S_F+10)$

Note: The calculation base on of Blue Angle; The German ecolabel criteria DE-UZ-205

S_M = Operating speed in pages per minute for monochrome printing

S_F = Operating speed in pages per minute during color printing

[12] Eco Mark No.155 "Imaging Equipment such as Copiers, Printers, etc. Version 1.4

13 DE-UZ-205 Equipment with printing function ((Printers and Multifunction Devices) edition 2017

Verification Method

The applicant must submit sound power lever test result accordance with the test method in ISO 7779[14], showing A-weighted sound power level (L_{WAd}) value must comply with ISO 9296[15]

5.4 3R Design of equipment[16]

5.4.1 The design of machine products must comply with the 3R design principle as specified in the Check list for 3R design.

Verification Method

The applicant must submit the certificate of designing accordance with the 3R design principle as specified in the Check list for 3R design (Appendix 1)

5.4.2 Plastic casing part (each plastic casing part) weighs more than 25 grams must be made from a single polymer plastic or a composite polymer. All plastic casing parts that total weight more than 25 grams must be produced from a mixture of polymers not more than 4 types.

Verification Method

The applicant must submit the certificate accordance with the special requirement 5.4.2 and showing the listed for type of plastic used and label used etc.

5.5 Requirements for plastic materials as follow;

5.5.1 Plastic parts that are components of the machine weighing from 25 grams up. Must not contain heavy metal or heavy metal compounds, flame retardants and plasticizers.

In case of contamination from raw materials, including

- Lead, mercury and hexavalent chromium must not exceed 0.1% by weight (1,000 mg/kg) cadmium shall not exceed 0.01% by weight (100 mg/kg).
  Note: If the sum of total chromium (Cr) is less than or equal to 1,000 mg/kg. It is assumed to meet the criteria of hexavalent chromium (Cr^{6+}).
- Flame retardants and plasticizers, including
  - PBB
  - PBDE
  - Bis(2-ethylhexyl) phthalate (DEHP),
  - Butyl benzyl phthalate (BBP),
  - Dibutyl phthalate (DBP)

[14] ISO 7779: Acoustics-Measurement of airborne noise emitted by computer and business equipment

[15] ISO 9296: Acoustics-Declared noise emission value of computer and business equipment

[16] Eco Mark No.155 “Imaging Equipment such as Copiers, Printers, etc. Version 1.

- Diisobutyl phthalate (DIBP)

Each type to be contaminated not more than 0.1% by weight (1,000 mg/kg).

Verification Method

The applicant must submit one of the following documents.

a. In case of the manufacturer has a system to manage the production of products that are free of prohibited substances must be submitted a copy of the manufacturer's certificate of evidence to ensure that have the content of heavy metals and flammable substances quantity not exceeding the requirement of 5.5.1. Also submit the manuals or evidence documents to ensure that there is a production management system of products that are free of prohibited substances.

2. In case of the manufacturer does not have a production management system of products that are free of prohibited substances must be submitted the results of the prohibited substance test of plastic casing part weighing more than 25 gram using the test method in accordance with the IEC 62321 **or** other method that able to test for the prohibited substances in plastic casing part by the laboratory has certified ISO 17025 in parameter of prohibited substances quantity comply with the green label requirement only.

5.5.2 Plastic casing part, weighing 25 g or more, must not contain halogenated polymers (Polymer containing halogen) except:

- Fluoroorganic additives used to improve the physical appearance of plastics must not exceed 0.5% by weight.
- Fluoroplastic plastics such as Teflon etc.
- Plastic parts in the fuser unit
- A large plastic exterior made from recycled plastics and is marked according to ISO 1043 or ISO 11469.

Verification Method

The applicant must submit the certificate accordance with the special requirement 5.5.2

5.5.3 Flame retardants used in plastic casing part weighing 25 grams or more shall be show the flame retardants name list and CAS number according to the principle specified within the ISO 1043-4 except large reusable plastic casing part weighing 25 grams or more.

Verification Method

The applicant must submit the flame retardants name list and CAS number or The code number accordance with the ISO 1043-4 except large reusable plastic casing part weighing 25 grams or more. Also the certificate meets the special requirement 5.5.3

5.5.4 Plastic parts weighing more than or equal to 25 grams must not contain the substances listed in Table 3.1 Annex VI of EU regulation (EC no. 1272/2008) of the following category

- Carcinogenic category Carc.1A, 1B
- Mutagenic category Muta.1A, 1B
- Toxic to reproduction category Repr. 1A, 1B

Verification Method

The applicant must submit the certificate that plastic part weighing more than or equal to 25 grams must not contain the substances listed in Table 3.1 Annex VI of EU regulation (EC no. 1272/2008) of that category.

5.5.5 Plastic parts that weigh more than or equal to 25 grams or have a flat surface area more than or equal to 200 square millimeters. The plastic classification symbol must be shown, with the symbol used in accordance with the industrial standard. TIS 1310 or plastic abbreviations are specified in accordance with ISO 1043 or ISO 11469

Verification Method

The applicant must submit the certificate that plastic part weigh more than or equal to 25 grams or have a flat surface area more than or equal to 200 square millimeters. The plastic classification symbol must be shown, with the symbol used in accordance with the industrial standard. TIS 1310 or plastic abbreviations are specified in accordance with ISO 1043 or ISO 11469. Also send the example parts or photo of the plastic parts that shown the symbol or abbreviation for inspection.

5.6 Batteries (only models with on-board backup batteries)

5.6.1 Must not contain lead and lead compounds.

5.6.2 Mercury and cadmium content must comply with battery specific requirements according to the latest EU directive.

5.6.3 Batteries installed in the product must able to be replaced without removing the entire printed circuit board.

Verification Method

The applicant must submit that the batteries accordance with the requirements 5.6 also the certificate from batteries' manufacturer.

5.7 Toners and Inks

5.7.1 Toners and Inks must not contain mercury, lead, cadmium, nickel and hexavalent chromium

Except high molecular weight nickel compounds in ink and ink cartridges.

Verification Method

The applicant must submit the certificate that toner and ink used in the cartridges accordance with the requirements 5.7.1 including certificate from toners and inks' manufacturer.

5.7.2. Toners and Inks must not use Azo dye color (dye or pigment) in ink that can be transformed into one or more amines (according to the test method in accordance with Section 35 of the German Food and Miscellaneous Goods Act as follows;

Table 4: Lists of the aromatic amines resulting from the decay of Azo groups

No.	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	5-nitro-*o*-toluidine	99-55-8
7	4-chloroaniline	106-47-8
8	4-methoxy-*m*-phenylenediamine	615-05-4
9	4,4'-methylenedianiline 4,4'-diaminodiphenylmethane	101-77-9
10	3,3'-dichlorobenzidine 3,3'-dichlorobiphenyl-4,4'-ylenediamine	91-94-1
11	3,3'-dimethoxybenzidine *o*-dianisidine	119-90-4
12	3,3'-dimethylbenzidine 4,4'-bi-*o*-toluidine	119-93-7
13	4,4'-methylenedi-*o*-toluidine	838-88-0
14	6-methoxy-*m*-toluidine (*p*-cresidine)	120-71-8
15	4,4'-methylene-bis-(2-chloro-aniline) 2,2'-dichloro-4,4'-methylenedianiline	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

Verification Method

The applicant must submit the certificate that toners and inks must not use Azo dye color (dye or pigment) in ink including the certificate from toner and inks' manufacturer or submit the result test method in accordance with Section 35 of the German Food and Miscellaneous Goods Act.

5.7.3 Toners and Inks used must not contain the hazardous substances listed in Table 3.1 Annex VI of EU regulation (EC no.1272/2008) in the following group;

- Carcinogenic category Carc.1A, 1B
- Mutagenic category Muta.1A, 1B
- Toxic to reproduction category Repr.1A, 1B

Verification Method

The applicant must submit the certificate that toner and ink used in the cartridges accordance with the requirements 5.7.3 including certificate from toners and inks' manufacturer.

5.8 Toner cartridges and Inks containers

5.8.1 Plastic parts that are components of the machine weighing 25 g or more. Must not contain heavy metal or heavy metal compounds, flame retardants and plasticizers.

In case of contamination from raw materials, including

- Lead, mercury and hexavalent chromium must not exceed 0.1% by weight (1,000 mg / kg) cadmium shall not exceed 0.01% by weight (100 mg / kg).

NOTE If the sum of chromium (total chromium (Cr)) is less than or equal to 1,000 mg / kg. It is assumed that the criteria for hexavalent chromium (Cr^{6+})

- Flame retardants and plasticizers are:
  - Polybrominated biphenyls (PBB),
  - Polybrominated diphenyl ethers (PBDE),
  - Bis(2-ethylhexyl) phthalate (DEHP),
  - Butyl benzyl phthalate (BBP),
  - Dibutyl phthalate (DBP)
  - Diisobutyl phthalate (DIBP)

Each species can be contaminated not more than 0.1% by weight (1,000 mg / kg).

Verification Method

The applicant must submit one of the following documents

1. In case that the manufacturer has a production management system for the production of prohibited substances, shall submit a copy of the document and evidence of the product manufacturer's certificate that ensure to have the content of heavy metals and flame retardants does not exceed the specified criteria in clause 5.8.1. including submit the manual book or evidence that ensure the production management system for the production of prohibited substances.
2. In case the manufacturer has no the production management system for the production of prohibited substances shall be summit the test of heavy metal content in plastic casing parts weighing more than 25 g. and flame retardant parts of the product by the test method accordance

with IEC 62321 or another test method that can test for the determination of the prohibited substance in plastic parts by the laboratory has certified ISO 17025 in parameter concern with determination of the prohibited substance in plastic parts accordance the green label requirement only

5.8.2 Plastic parts of the cartridge must produce by one single polymer or polymer blends thus the all of plastic parts must produce by mixed of polymer that not more than 4 types in form of Mutually separable polymers or polymer blends

Verification Method

The applicant must submit the certificate that plastic parts of the cartridge accordance with the special requirement clause 5.8.2

5.9 Capability use with quantity of the recycled pulp paper accordance with the criteria as follow;

Device Type	Estimated recycled pulp of the paper that can be used.
Copier and Multifunction Copier	100%
Printer and Multifunction printer	Minimum 70%

Verification Method

The applicant must submit the certificate that device can use with the paper that quantity of recycled pulp as require.

5.10 The spare parts or accessories must be guaranteed for use in replacement or repair after discontinue of that model for at least 5 years.

Verification Method

The applicant shall submit the certificate that copiers must be guaranteed that spare parts or accessories can be replacement or repaired at least 5 years after discontinue of that model.

5.11 Photosensitive drum must not contain cadmium, lead, mercury and selenium

Verification Method

The applicant shall submit the certificate that photosensitive drum must not contain cadmium, lead, mercury and selenium.

5.12 Double-side copying or Duplex unit and copying must be able to print on both 2 pages of office paper according to the criteria in Table 5. If the 2-sided printing capability of office paper is tested under Color condition, the test is not required. Another test of black and white condition (Monochrome)

Table 5 Minimum print speed requirements for saving paper machine

Pages per minute; PPM		Minimum requirements for 2-sided printing / copying
Color	Monochrome	
≤19	≤24	The product must have a manual feeding system as an alternative to 2-sided copying.
>19-35	>24-37	The product must be equipped for the 2-sided copying function as an automatic option (Default) or must have additional accessories included with the device.
>35	>37	The product must be equipped for the 2-sided copying function as an automatic option (Default).

Verification Method

The applicant shall submit the certificate that it can be printed on office paper, both 2 pages meeting the criteria specified in Table 5, and disclosed in the product documentation.

5.13 In the production process, the chemicals listed in Table 6 shall not be used in the final manufacturing stage of the machine. Circuit board manufacturing process or cleaning the work piece for reuse.

Table 6 Group of synthetic chemicals containing chlorine

CFC5s	Trichlorofluoromethane Dichlorodifluoromethane Trichlorotrifluoroethane	Dichlorotetrafluoroethane Chloropentafluoroethane
Other CFCs	Chlorotrifluoromethane Pentachlorofluoromethane Tetrachlorodifluoroethane Heptachlorofluoropropane Hexachlorodifluorpropane	Pentachlorotrifluoropropane Tetrachlorotetrafluoropropane Trichloropentafluoropropane Dichlorohexafluoropropane Chloroheptafluoropropane
	Carbon Tetrachloride	
	1,1,1-Trichloroethane	
HCFCs	Dichlorofluoromethane Chlorodifluoromethane Chlorofluoroethane Tetrachlorofluoroethane Trichlorodifluoroethane Dichlorotrifluoroethane Chlorotetrafluoroethane Trichlorofluoroethane Dichlorodifluoroethane Chlorotrifluoroethane Dichlorofluoroethane Chlorodifluoroethane Chlorofluroethane Hexachlorofluoropropane Pentachlorodifluoropropane Tetrachlorotrifluoropropane Trichlorotetrafluoropropane	Pentachlorofluoropropane Tetrachlorodifluoropropane Trichlorotrifluoropropane Dichlorotetrafluoropropane Chloropentafluoropropane Tetrachlorofluoropropane Trichlorodifluoropropane Dichlorotrifluoropropane Chlorotetrafluoropropane Trichlorofluoropropane Dichlorodifluoropropane Chlorotrifluoropropane Dichlorofluoropropane Chlorodifluoropropane Chlorofluoropropane Dichloropentafluoropropane Chlorohexafluoropropane

Verification Method

The applicant must submit the certificate that in the production process, the chemicals listed in Table 6 shall not be used in the final manufacturing stage of the machine. Circuit board manufacturing process or cleaning the work piece for reuse

5.14 Packaging

5.14.1 Plastic packaging

(1) Plastic packaging materials must not use the substances shown in Table 6.

Verification Method

The applicant must submit the certificate that plastic packaging materials must not use the substances shown in Table 6

(2) Plastic packaging must contain halogen and organic halogenides as elements.

Verification Method

The applicant must submit the certificate that plastic packaging must contain halogen and organic halogenides as elements.

(3) Plastic packaging shall have a type of plastic symbol in accordance with Industrial Standards number TIS 1310 or a plastic abbreviation according to ISO 1043 or ISO 11469.

Verification Method

The applicant must submit the certificate that ensure plastic packaging had symbol to define type of plastic according to TIS 1310 or ISO 1043 or ISO 11469 or submit the evidence such as plastic packaging example or the photograph where the symbol on the package is visible.

5.15 The applicant need to receive the used cartridge and the image receiving template back from the customer. It is clearly stated in writing on the copier, document or the user manual that give to consumer when purchase or on the applicant's website.

Verification Method

The applicant must submit the evidence to define that the used cartridge and the image receiving template was returned. It is clearly stated in writing on the copier, document or the user manual that give to consumer when purchase.

5.16 There is detailed information (in Thai) as follows in the user manual / attachment provided the consumer when purchasing the product.

(1) Instructions for placing the device
(2) Specify the purpose and location for the return of the product and all parts waste to reduce resource consumption by being recycled or eliminated according to the law.
(3) Speed of printing (number of page per minute)
(4) Defined the information of Energy Saving Mode by show Typical Electricity Consumption (TEC) according Energy Star latest version.
(5) Indicates that copies can be made on both sides of the paper.
(6) Recommendations to turn off the device when not in use.
(7) Number of discs to replace the ozone filter (if any), image receiving template and heat rubber ball.
(8) Specify the device's volume value during use. If the sound produced by the product is valuable L_{Wad} more than 63dB. Please state in the instructions that it should not be placed in a room with normal people working. There should be dedicated areas for copier and printer products.

Verification Method

The applicant must submit the evidence that user manual or product safety data sheet or attachment provide the consumer or the information on website by specifying details in accordance with the requirements 5.16

6. Requirements on testing and certificate

6.1 Testing

6.1.1 The test shall be performed in laboratory as follows;

Government laboratory or a laboratory under the supervision of the governor of the statue section 5 according to Industrial Product Standards Act, B.E. 2511 (and amend) or laboratory with the competence of testing and calibration by TIS 17025 Standard or ISO/IEC 17025 with the relevant scope or a laboratory registered with the green label.

6.1.2 Testing result

6.1.2.1 The testing report that the method specified in the green label requirements. In case, the applicant submits the testing report with according to other test methods equivalent to the method specified in the green label requirements, the applicant shall submit the document as follow; (attached with the testing report also)

1) The certified signature document of the apply product from the laboratory that equivalent with test method standard specified in the green label requirements
2) The document showing the comparison between the test method used by the applicant to test the product and the test method specified in the green label requirements.

6.1.2.2 In case of requesting certification for the first time must not be more than 3 years up to the date of application for green label certification

6.1.2.3 If the product is a green label certified model and requires re-certification. The same test results can be used over 3 years old with a certificate of test results that there is no change in any components of the machine.

6.2 Certificate of compliance with green label requirements

6.2.1 The certificate shall not exceed 3-year duration since the apply date

6.2.2.The certificate signed by legally authorized person and stamped with the company hallmark (if any)

6.3 In case of a change in testing methods or the requirement standard this term referenced to that consider accepting the test results according to the latest version of the standard until further changes.

Appendix

1. Checklist for 3R design of equipment/consumables

Equipment must be configured to be suitable for recycling, and must satisfy all Must (M) items of the requirements in the following groups.

A: Design and Joining Technique
B: Selection and Marking of Materials
C: Longevity
D: Resource Saving

Requirement		Applicable scope	Category	Compliance	Remarks
A: Design and Joining Technique					
A1	Are assemblies made of mutually incompatible materials separable or connected by separation aids?	Casing parts, chassis, electric/electronic assemblies, modules for colourants	M	• Yes/ • No	Connections between casing and chassis as well as between chassis and electric/electronic assemblies are important. Their separability is a prerequisite for separate reuse/recycling of assemblies and materials and for a quick and reliable separation of components containing hazardous substances. Glued nameplates (i.e. company logos and stickers) are also included. The term "separation aids" refers to predetermined breaking points, for example.
A2	Are electric/electronic assemblies easy to find and remove?	Entire unit, including lamps	M	• Yes/ • No	The minimal strategy for recycling is to remove hazardous substances. For example, electric/electronic assemblies and components listed in Annex VII of the revised WEEE Directive (2012/19/EU Directive), such as batteries and condensers which have a risk of containing constituents having hazardous substances, as well as fluorescent lamps containing mercury, must be easy to find and separate.

Requirement		Applicable scope	Category	Compliance	Remarks
A4	Can disassembly be done exclusively with general-purpose tools?	Casing, chassis, electric/electronic assemblies	M	• Yes/ • No	The term ’general-purpose tools‘ refers to widely used, commercially available tools. This requirement does not apply to connections where legal regulations have limited the choice of joining technique.
A5	Has consideration been given to the point of application and the work space required for disassembly?	Casing parts, chassis, electric/electronic assemblies	M	• Yes/ • No	The point of application is where the force of the tool is to be transmitted to the connecting element. Then, in order to enable disassembly operation to be performed with the tool, there must be adequate work space. This requirement especially Covers snap-on connections, which, in contrast to the assembly process, can often be loosened with the tool.
A7	Can screw connections for fastening assemblies be released with no more than three tools?	Casing parts, chassis, electric/electronic assemblies	M	• Yes/ • No	Standardised and uniform connecting elements facilitate disassembly. The fewer tools needed are, the simpler assembly and disassembly are. A tool is characterised by its type of drive (e.g. Phillips-head screwdriver) and size of drive (wrench size).
A9	Can the disassembly be performed by one person?	Entire unit	M	• Yes/ • No	If the undercut angle is more than 90º, any number of snap-on connections in the same joining direction can be assembled simultaneously, whereas this may not hold for disassembly. It is considered that this requirement is not met if more than three snap-on connections have to be loosened at the same time.

Requirement		Applicable scope	Category	Compliance	Remarks
A11	Are casing parts free of electric/electronic assemblies?	Casing parts	M	• Yes/ • No	To facilitate the clean and fast removal and separation of hazardous substances from the electronic components, all electric/electronic assemblies must be fastened to the chassis. The casing must not contain any electric/electronic assemblies. A control element fastened to the casing and casing parts at the same time fulfilling the function of the chassis are not considered as casing parts here.
A12	Has the manufacturer carried out a trial disassembly (e.g. in accordance with A1 to A11) and recorded it with a focus on weak spots?	Entire unit	M	• Yes/ • No	
B: Selection and Marking of Materials					
B1	If labels, etc. to be attached to plastic casing parts are difficult to separate, they must be made of the same material as the plastic parts, or any material that does not prevent recycling.	Casing parts of 25g or more	M	• Yes/ • No	In order to recycle as high-quality materials, labels, etc. must be easily separable from plastic parts to which they are attached, or it is desirable that they are made of same materials (compatibilization).
B2	Is the variety of materials used for plastic parts having similar functions limited to one kind?	Casing parts, chassis, and mechanical parts of 25 g or more	M	• Yes/ • No	For instance, "similar functions" refer to functionality such as “impact resistance” and “abrasionresistance”. The smaller the varieties of materials are, the more efficient the separation and

Requirement		Applicable scope	Category	Compliance	Remarks
					recycling processes are. This requirement does not apply to parts that are demonstrably reused.
B4	Has the coating of plastic parts been limited to a minimum?	Casing parts, modules for colourants	M	• Yes/ • No	'Coating' refers to a layer of coating material, vapor-deposited layer, and print. Galvanic coatings are not permissible. Large-area coating layer, vapour-deposited layer and print on plastic parts require additional treatment for removal if the materials are to be recycled subsequently. Reasons must be given for coatings of special parts. Laser markings are not considered as prints referred to herein. This requirement does not apply to demonstrably reused parts. It is considered, however, that the product conforms to this item if the coating materials that do not prevent recycling are used, or coating works are conducted with consideration for occupational safety and health of coating workers and reduction of environmental burden. "Coating materials that do not prevent recycling" refers to the coating materials that have compatibility with materials of parts to be coated, and do not prevent high-level material recycling (horizontal recycling for in-house products). 'Considerations for occupational safety and

Requirement		Applicable scope	Category	Compliance	Remarks
					health of coating workers‘ means that a coating workshop is ventilated/vented and workers wear protective gear. ‘Considerations for reduction of environmental burden’ includes the measures to control VOC emission into the air, such as the removal equipment, the devices in coating process, or replacement by low-VOC coating materials.
B5	Are recyclable materials and material composites used?	Casing parts, chassis, modules for colourants	M	• Yes/ • No	“Recyclable material” means that recycled material identical to the original material (recycling at the original level) can be manufactured. This item asks the intention and goalsupon designing and does not ask whether recycling is actually conducted.
B6	Is partial use of recycled plastic material permitted?	Casing parts, chassis, modules for colourants	M	• Yes/ • No	“Permitted” means that a material that meets the requirements provided in the specifications may be used if it is available. “Partial” means some available plastic components are appropriate. (This does not require available components.) A closed cycle is realized only if the manufacturer has already used recycled materials, or if they announce the commitment to do so in the product specifications.
B8	Are parts and materials that fall under Appendix 1 of the EU	Entire unit	M	• Yes/ • No	

Requirement		Applicable scope	Category	Compliance	Remarks
	WEEE Directive easy to remove?				
B9	selected according to B1 to B6 and has this been documented?	Casing parts, chassis, modules for colourants	M	• Yes/ • No	
B10	Are plastic parts weighing 25 g or more and having a flat surface larger than 200 mm^2 marked in accordance with ISO 11469, taking ISO 1043 into consideration?	Entire unit (Plastic parts contained in reused complex assemblies are not included.)	M	• Yes/ • No	The marking of plastics shall enable all recycling companies to sort plastics by type.
B11	Do secondary batteries have identifications indicating a type?	Internal battery	M	• Yes/ • No/ • No use of internal battery	Secondary batteries need to be identified in order to promote collection and recycling there of
C: Longevity					
C1	Are at least 50% or more of components of equipment, excluding standard parts, used as common parts to other models of the same generation and the same performance category of the same manufacturer?	Entire unit			
C2	Is use of recycled assemblies or parts scheduled or permitted?	Entire unit	M	• Yes/ • No	This means that the manufacturer should be willing to reuse assemblies and components as spare parts or ETN (Equivalent To New) parts under his responsibility.

Requirement		Applicable scope	Category	Compliance	Remarks
C4	Can modules for colourants be reused?	Modules for colourants	M	• Yes/ • No/ • Not covered. (No use of modules for colourants)	Constructive measures shall not prevent reuse.
C5	When batteries installed in equipment reach the end of their life or are repaired, replacement or removal thereof shall be possible, without removing an entire printed circuit board, etc. on which the batteries are mounted.	Printed circuit board, etc.	M	• Yes/ • No/ • No use of internal battery	A structure that allows easy replacement of batteries at the end of their life leads to avoidance of disposal of the equipment and to a longer life.
D. Resource Saving					
D1	Equipment shall be designed in consideration of weight reduction/volume reduction.	Products	M	• Yes/ • No/ • No conventional Machine having equivalent functionality is present.	This results in weight reduction/volume reduction of equipment.
Are all "M" requirements satisfied and "Yes" answers given to them?			M	• Yes/ • No	

2. Summary of the Green Label Certification Process

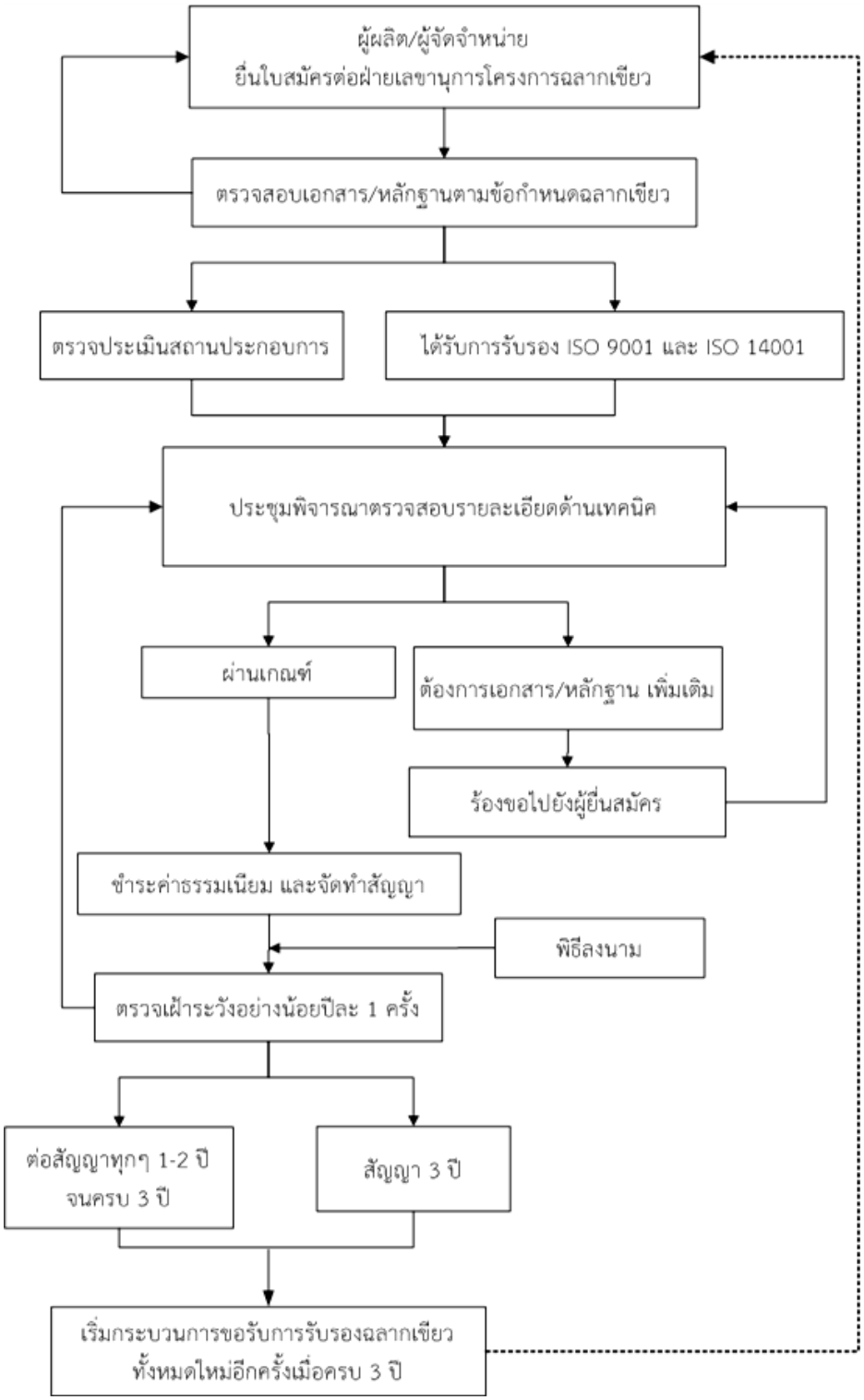

Figure 1 Green Label Certification Process

3. Environmental Impact of copier

Product environmental impact when consideration through product life cycle can be divided 5 cycles such pre-production, during production, transportation, utilization and disposal herein will be consideration 4 cycles are during production, transportation, utilization and disposal.

Table 6 Initial Environmental Impact of copier

Environmental Aspect	Copier Product Life Cycle				
	Pre-Production	During Production	Transportation	Utilization	Disposal
Resources used					
– Raw material		○	○ 4)	● 2),7)	×
– Energy		○	○ 5)	● 8)	×
– Water		×	×	×	×
Emission/release of pollutant into					
– Air		○ 1)	○ 6)	● 9)	×
– Water		×	×	×	×
– Soil		○ 2)	×	×	×
Hazardous waste		○ 3)	×	● 10)	● 2), 6) , 10)
Solid waste		○ 4)	○ 4)	○ 7)	○
Other pollution					
– Noise		○	○	●	×
– Light		○	×	○	×
Fitness for use				●	×
Safety				●	×

Remark ● Must consider when issuing the requirements
○ Impacted but not define in the requirements
× Unconcerned

1) Lead vapor from soldering
2) Toner powder
3) Bonding which it is heavy metal
4) Packaging
5) Grease
6) CO, SO_x, NO_x, dust
7) Paper
8) Electricity
9) Dust, VOCs, Ozone
10) Cadmium, flame retardant

3.1 During-Production

The production of copier in Thailand is Assembling various equipment parts of the machine together with the use of electric power and various chemicals such isopar and ethanol (use for cleaning parts), resin and glue (use to connect parts), grease (used for lubrication). Various chemicals that use in production process are flammable chemicals. Therefore, there should be a proper storage system. During the production process there will be heat generated by a hot air blower, smell and vapors from soldering including a loud noise from some devices which workers can avoid if they wear protective equipment. In addition, in the quality inspection process and adjusting specification will have ultraviolet light occurs which workers should avoid prolonged exposure to this radiation.

There are many types of waste in the production process such as plastic bags, plastic plates, foam, rubber scrap, chemical bottles, paper scrap, cloth scrap, used gloves etc. Many waste can be processed and recycled. Therefore, waste should be separated before throwing away.

3.2 Utilization

Various effects that occur during utilization which It is harmful to health and has environment impact as follow;

1. Ozone: O_3 caused by the compression and discharge of electric charges in image receiving template and paper. Some of ozone cause by emission of ultraviolet light from high power electric tube of the copier which makes the oxygen in the air easier to combine into ozone. However, in normal conditions or in a general office. Ozone decomposes into oxygen in 2-3 minutes. The rate of ozone decay depends on the time period, temperature (Ozone decomposes more quickly at high temperatures), ventilation and objects surface on which ozone touches. If it is activated carbo will cause the ozone to decay up to 100%. Therefore, most modern copiers have an activated carbon filter attached to decompose ozone before it is released outside the copier. Ozone is generally a gas that is irritating to the optic nervous system and skin. And when inhaling ozone for a long time can cause diseases related to the lungs. Ozone at concentration more than 0.25 ppm that the effect is irritating to the eyes, nose and throat. Shortness of breath, dizziness and headache. Moreover, is the cause of exhaust and loos of smell if inhaling ozone for a long time may damage the lungs.

   Currently, the production and operation technology of copiers, printers have evolved a lot, resulting in very little ozone being generated.

2. Toner that divided 2 types as;
   (1) Toner, inhaling toner dust into your body has an irritating effect on the respiratory system. In addition, the chemicals contained in some toners are dangerous substance which of these substances when the body is exposed can cause cancer such as Nitropyrene (found in carbon black powder) and Trinitropyrene. Besides being a carcinogen, it is also a gene that changes or destroys genes resulting in abnormalities in the fetus. Polymer substances such as resin, the plastic in the toner is a common cause of allergic reactions due to repeated skin exposure by showing signs of itchy rashes on the skin, hot sensation in the eye. This problem is more common in workers who regularly provide photocopying services than in general users.

(2) Liquid toner which is a component of organic matter such as petroleum, hydrocarbon. Therefore, continuous exposure to these solutions will be the cause of skin irritation, eyes, respiratory system and harmful to the central nervous system. In addition to hydrocarbon compounds released that organic chemical solvents in toner are also harmful to health as well.

(3) Another chemical compound such as selenium, cadmium sulfide, zinc oxide and some polymers which is coated at image receiving template look like photo-conductor. It is usually released into the atmosphere as vapors during the copying process. Selenium is the cause of irritation, upper respiratory, eyes and the mucous layer of the stomach. Taking too much selenium can cause a bad taste or getting tired, indigestion, dizziness. Moreover, high levels of selenium can damage the liver and kidneys. Cadmium is more dangerous than selenium because it is a carcinogen. However, cadmium is released from copiers in smaller quantities.

(4) Ultraviolet light, UV) is radiated from a high power lamp during copying. Effects of exposure to UV rays as if the skin was sunburned. The symptoms appear to be more or less severe depending on the UV wavelength. But usually, the UV light will not penetrate the sheet of glass that holds the original copy of the copier. Therefore, the risk of exposure to UV light is minimal. However, the pain in the head and burning eyes. This can happen after looking at the light that has penetrated through the glass which will have a wavelength between 350-1,100 nm. And exposure to this radiation for a long time May cause skin cancer.

(5) Noise pollution, most copiers are quite noisy. Especially large machines may be as loud as 80 dBA.

(6) High consumption of electrical energy and the heat emitted by the operation of the high energy lamp. Is the cause of discomfort if copying must be performed for an extended period of time in a room with insufficient ventilation.

3.3 Disposal

An expired cartridge, when disposed of, has an environmental impact. This is because residual toner or liquid ink may leak into the soil, water can accumulate and be harmful to living organisms in the environment. Copiers with PBB, PBDE, or Chloroparaffins it is a component in flame retardant. When it expires, then take it away. These substances can bioaccumulation and food chain causes toxicity to living things in the environment.

References

1. TIS.1561: Information technology equipment - safety - part 1: general requirements; Thai Industrial Standards Institute
2. TIS 1956: Information technology equipment: radio disturbance limits; Thai Industrial Standards Institute
3. TIS. 1310: Symbols for recycling plastics, online search on October 12, 2020 http://www.ratchakitcha.soc.go.th/DATA/PDF/2538/D/088/8.PDF ; Thai Industrial Standards Institute
4. DIRECTIVE 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE).
5. DIRECTIVE 2002/95/EC of the European Parliament and of the Council of of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
6. DIRECTIVE 1272/2008/EC of the European Parliament and of the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures, amending and repealing.
7. IEC 60950-1:2005: Information technology equipment - Safety - Part 1: General requirements; online search on October 12, 2020: https://www.iecee.org/dyn/www/f?p=106:49:0::::FSP_STD_ID:4020
8. IEC 62368-1:2018: Audio/video, information and communication technology equipment - Part 1: Safety requirements. online search on October 12, 2020: https://webstore.iec.ch/publication/27412
9. CISPR 32: New International Standard on Electromagnetic Emissions from Multimedia Equipment; online search on October 12, 2020: https://interferencetechnology.com/wp-ontent/uploads/2012/04/Hoolihan_NA_s_DDG12.pdf
10. BS EN 55032:2015: Electromagnetic compatibility of multimedia equipment. Emission Requirements; online search on October 12, 2020: https://www.en-standard.eu/bs-en-55032-2015-electromagnetic-compatibility-of-multimedia-equipment.-emission-requirements/
11. ISO 14001 - Introduction to ISO 14001:2015; online search on October 12, 2020, https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100371.pdf
12. ISO 7779:2010: Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment; online search on October 12, 2020: https://www.iso.org/standard/54363.html
13. ISO 9296:2017: Acoustics — Declared noise emission values of information technology and telecommunications equipment; online search on October 12, 2020:
14. ISO 1043-1:2011: Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics; online search on October 12, 2020: https://www.iso.org/standard/50590.html
15. ISO 11469:2016: Plastics — Generic identification and marking of plastics products; online search on October 12, 2020; https://www.iso.org/standard/63434.html
16. Nordic Eco labeling of Imaging equipment Version 6.2 (20 June 2013 - 30 June 2016).
17. CCD-035 Office Machines Last revised:2007/09 (minor edits 2008/01) EcoLogo Program Certification Criteria Document.

18. Eco Mark No.155 “Imaging Equipment Such As Copiers, Printers, etc. Version 1 (1 May 2014 - 30 April 2021).
19. The blue angel RAL-UZ 171 Office Equipment with Printing Function (Printers, Copiers, Multifunction Devices) edition July 2012.
20. Korea Eco Label EL142. Printers EL 142-1999/10/2013-23.
21. The New Zealand Ecolabelling Trust (Copying Machines, Printers, Fax, Machines and Multifunctional Devices) EC-24-09 May 2009.