

## **EL142. Printers**

[EL 142-1999/8/2009-72]



### **1. Scope**

The criteria apply to printers commonly used in office and home in connection with computers, which include laser printers, ink-jet printers. Printer-based multifunctional devices which have one or more functions among those of printer, scanner and facsimile are also included. Exempted from this criterion are the printers used in printers for continuous roll type paper exceed printing speed 60 PPM, printers exceed printing speed 70 PPM and large format printers.

### **2. Definitions**

#### 2.1

“Printing speed” refers to pages per minute (PPM) when printing A4-sized paper in the direction that allows the highest speed. However, the printing speed of color printers is to be defined according to its manufacturer’s definition.

#### 2.2

“Standby mode” refers to the mode in which the product is ready to perform the next hard copy output after the last one was completed.

#### 2.3

“Large format printer” refers to a printer with a printing function for printing A2 or larger size sheets. It includes products that accept continuous roll type paper having a width of 406 mm or more.

#### 2.4

“Ozone depletion potential (ODP)” refers to the value indicating the relative impact of substances depleting ozone when the ozone depletion impact of CFC-11 is set to be 1.

#### 2.5

“Volatile organic compounds emissions (VOCs emissions)” refers to the quantity of the VOC (Volatile Organic Compounds) per unit hour that is discharged to the outside while

the product is running under the defined conditions.

Note) This standard tentatively defines them as VOCs from n-hexane to n-hexadecane on the chromatogram, which is created by the gas chromatograph equipped with the mass spectrometer

### 3. Certification Criteria

#### 3.1 Environmental Criteria

##### 3.1.1

With respect to pollutant emission at use stage, Emission of Ozone, VOCs, benzene, styrene of products shall comply with the following requirements.

		Emission rate(mg/h) <sup>Note1) Note2)</sup>		
		Mono- chrome	Color	
Dust <sup>Note3)</sup>		≤4.0	≤4.0	
Ozone <sup>Note3)</sup>		≤1.5	≤3.0	
VOCs	Printing phase	≤10	≤18	
	Ready phase	Floor- mounted	≤2	-
		Tabletop	≤1	-
Benzene		≤0.05	≤0.05	
Styrene		≤1	≤1.8	

Note1) If two devices of identical design differ in their maximum print speed or the printers able to vary printing speed, the test result of printing at highest speed is considered to represent that of below highest speed.

Note2) If the emission rate determined also meets the limit values for monochrome printing when printing the color test page, no additional testing of color equipment will be required for monochrome printing.

Note3) Ozone Emission is applied only on laser printer.

##### 3.1.2

Noise emission of the product (sound pressure level or sound power level) shall comply with the following requirements by printing type.

Class		Mono- chrome	Color
Sound pressure Level [dB(A)]	Standby mode	≤40	≤40
	Printing mode	≤0.35×Printing spee+51 and ≤67	≤0.35×Printing spee+53 and ≤67

Sound power Level [dB(A)]	Standby mode	≤48	≤48
	Printing mode	≤0.35×Printing speed+59 and ≤75	≤0.35×Printing speed+61 and ≤75

Note1) If the product has mono-chrome mode and color mode, the test results of both printing mode shall be met this criterion..

Note2) If the test results of both sound pressure level and sound power level are available, the result of sound power level shall be applied preferentially.

### 3.1.3

With respect to resource and energy consumption at use stage, the product shall comply with the following requirements.

#### 3.1.3.1

The power saving performance of the product should satisfy the operation regulation of the standby power saving program in accordance with the Energy Use Rationalization Act, which is applicable at the time of certification application. However, in case the product meets the requirements of the International Energy Star Program applicable at the time the application for eco-label is made, it is regarded as equivalent.

#### 3.1.3.2

Mono-chrome printers with printing(or copying) speed of 25PPM(or CPM) or more and color printers with printing(or copying) speed of 20PPM(or CPM) or more shall be capable of printing out on both sides of a single sheet of paper with or without additional equipment.

Note1) This criterion shall be applied only laser-printing based products

Note2) 'CPM' is defined in 'EL141. Copiers'.

### 3.1.4

With respect to use of chemical substances in manufacturing process and recyclability of the parts of the product at disposal stage, the product shall comply with the following requirements.

Note) This Criteria shall not applied on materials which are exempted from Hazardous Substances Restriction lists on EU Directive 2002/95/EC and lead in solder of printed circuit board (PCB). However, in case of revision of EU Directive 2002/95/EC, this shall follow revised EU Directive which is applicable at the time the application for eco-label certification.

#### 3.1.4.1

Lead, cadmium, mercury and their compounds, and hexavalent chromium compounds shall not be used in the product.

#### 3.1.4.2

Content of lead, cadmium, mercury and hexavalent chromium in the parts of the product shall comply with one of the following requirements.

a) The applicant shall have an appropriate system to control the content of hazardous substances as following requirements.

Substance	Pb	Cd	Hg	Cr <sup>+6</sup>
Content [mg/kg]	≤1000	≤100	≤1000	≤1000

b) Provided that the applicant does not have an appropriate system for the control of hazardous substances, the content of hazardous substances in the parts of the product shall comply with the following requirements.

Substance	Pb	Cd	Hg	Cr <sup>+6</sup> (note)
Content [mg/kg]	≤1000	≤100	≤1000	≤1000

Note) In case the content of total chromium (Cr) is 1000 mg/kg or less, it is regarded as equivalent

#### 3.1.4.3

PBBs (polybrominated biphenyls), PBDEs (polybromodiphenyl ethers) and short-chain chlorinated paraffins (C= 10~13) whose chlorine concentration is 50% or more shall not be used in the product.

#### 3.1.4.4

Photo-sensitive layers in the laser printers shall not use lead, cadmium, mercury, selenium and their compounds.

#### 3.1.4.5

Provided that the product is equipped with a battery, the content of lead, cadmium, mercury in the batteries shall comply with EU directive 2006/66/EC

#### 3.1.4.6

Halogenated plastics such as PVC shall not be used for the plastic case parts weighing

25g or more, and also halogenated compounds shall not be contained in the plastic parts. Exempted from this criterion are the fluorogranic additives with less than 0.5 wt% (e.g. anti-dripping).

### 3.1.5

With respect to recycling in manufacturing process and recyclability of the product at disposal stage, the product shall comply with the following requirements.

#### 3.1.5.1

Separable plastic parts (weighing 25g or more and covering a flat surface of 200mm<sup>2</sup> or more) shall be visibly marked with material identification to facilitate separation and collection in disposal.

#### 3.1.5.2

Plastic case parts weighing 25g or more shall be made of maximum four different materials in easily separable way. At the same time, each plastic case part weighing 25g or more shall be made of a single polymer (homo- / copolymer) or recyclable polymer blends (polymer alloys). In addition, labels, markings and stickers shall be made of the same material as the plastic parts to which they are affixed or shall be recycling-compatible.

#### 3.1.5.3

With respect to the disassembly of product, the product shall comply with the following requirements.

- a) Module must be easily separable.
- b) There must be sufficient space to insert tools at fixing points/dismantling points.
- c) Joints between different materials must be easy to find.
- d) Non-separable joints such as glued or welded joints between different materials may not be used.

#### 3.1.5.4

Halogenated plastics such as PVC shall not be used for packaging materials.

#### 3.1.5.5

Shock-absorbing materials in packaging shall be made of recycled pulp or paper such as pulp mold. Shock-absorbing materials in packaging shall be made of recycled pulp or paper such as pulp mold. However, following materials are regarded as equivalent.

a) Shock-absorbing materials certified according to 'EL 606. Packaging Materials'

b) Shock-absorbing materials manufactured by using more than 50wt% of recycled plastics

c) EPS (expanded polystyrene), EPE (expanded polyethylene) and EPP (expanded polypropylene) whose foaming agent has zero ODP

d) Air cell packing bubble wrap that injects air into synthetic resins.

#### 3.1.5.6

The applicant shall have take-back system for waste products (including waste toner, waste drum and shock-absorbing materials) and the system for recycling of the waste drum collected by take-back system. In case the applicant assigns a company to take-back and recycle waste products and submits the relevant result, it is regarded as equivalent.

#### 3.1.5.7

The recycle rate of the products in accordance with "Act on the resource circulation of electrical and electronic equipment" must be 75 weight percent or more.

#### 3.1.5.8

the toner cartridges supplied by the printer manufacturers must be reusable structure after processing of refill or remanufacturing, etc..

#### 3.1.6

The product shall be designed and manufactured with a perspective on resource- and energy-saving, reduction of pollutant emission and hazardous substance use, recycled material use, recyclability, lifespan extension, etc. in order to reduce environmental impacts throughout the life cycle.

### 3.2 Quality Criteria

#### 3.2.1

The quality of the product shall satisfy the requirements of the safety standards in accordance with the Korean Safety and Control Act for Electric Appliances.

#### 3.2.2

The quality of the product with facsimile function shall meet the requirements of the model-approval standards for electric and communication tools and materials.

### 3.3 Information for Costumers

#### 3.3.1

Instruction on the replacement procedure and the recommended frequency of ozone filter exchange, when it is used

#### 3.3.2

Information on the take back service for waste product, packaging material, toner or ink cartridges

#### 3.3.3

Warranty period of the product, availability of spare parts, post-sale customer service and contact numbers

## 4. Test Methods

Certification Criteria		Test and verification Methods
Environmental Criteria	3.1.1	Test report by an accredited testing laboratory in accordance with the test method specified in 4.1 and 4.2
	3.1.2	<ul style="list-style-type: none"><li>• Sound pressure level: test report by an accredited testing laboratory in accordance with the test method specified in 4.1 and 4.3</li><li>• Sound power level: test report by an accredited testing laboratory in accordance with ISO 7779 and ISO 9296</li></ul>

	3.1.3	3.1.3.1	Test report by an accredited testing laboratory in accordance with the test method of 'Energy Standby Program' or 'International Energy Star Program' or certificate of equivalent
		3.1.3.2	Verification of submitted documents
	3.1.4	3.1.4.1	Verification of submitted documents
		3.1.4.2	Verification of submitted documents in accordance with the test method specified in and 4.4
		3.1.4.3 ~3.1.4.6	Verification of submitted documents
	3.1.5~3.1.6		Verification of submitted documents
Quality Criteria	3.2.1		Test report by an accredited testing laboratory in accordance with the safety standards for electric appliances or certificate of equivalent
	3.2.2		Model-approval certificate
Information for Consumer			Verification of submitted documents

#### 4.1 General Matters

##### 4.1.1

One test sample for each applied product are required.

##### 4.1.2

Test samples shall be collected at random by eco-label certification body from products on the market or those in storage at the production site.

##### 4.1.3

All measuring shall be done at the stable state after the product reaches the standard copying condition suggested by the applicant under normal operating condition in office.

##### 4.1.4

Test result shall be numerically set according to KS Q 5002 (Statistical interpretation method of the data – Part 1: Statistical description of the data).

#### 4.2 Test method for measuring the ozone, VOCs, benzene and styrene emission

Note) This is a modified and adjusted method based on the ozone emission measurement



method specified in 'Appendix 2 of RAL-UZ 122 and 'ISO IEC 28360'.

#### 4.2.1

##### Emission Testing Chamber

##### 4.2.1.1

The size of testing chamber shall meet follow requirement. If in doubt, a smaller chamber size should be selected

$$0.01 < \frac{V_{EUT}}{V_{CHAMBER}} < 0.25$$

$V_{EUT}$  : volume of product[m<sup>3</sup>]

$V_{Chamber}$  : volume of testing chamber [m<sup>3</sup>]

##### 4.2.1.2

The wall, floor and the various ports and wall of the test chamber must make good seals with the power cables and sensor lines passing through allowing VOC, dust and ozone to be sampled simultaneously.

##### 4.2.1.3

The following test conditions have to be adhered and under no circumstances must water condensation take place in the chamber

- Temperature 23 °C ± 2 K
- Relative air humidity 50 % ± 5 %
- Adjustable air exchange rate Large chamber ( $V > 5 \text{ m}^3$ ) ( $1 < n < 2$ ) ± 5%  
Small chamber ( $V < 5 \text{ m}^3$ ) ( $1 < n < 5$ ) ± 5%
- Air flow velocity 0.1~0.3 m/s

##### 4.2.1.4

Chambers must be checked for compliance with the test requirements before they are first used. The chamber blank values must stay below the following levels at an air exchange rate of  $n=1 \text{ h}^{-1}$ :

- Dust : < 10  $\mu\text{gm}^3$
- Ozone: < 4  $\mu\text{gm}^3$
- VOCs: < 20  $\mu\text{gm}^3$
- Benzene: < 2  $\mu\text{gm}^3$
- Styrene: < 2  $\mu\text{gm}^3$

## 4.2.2

### Test procedure

#### 4.2.2.1

For the determination of the blank value and for the testing in the pre-operating phase an air exchange rate of  $n = 1$ ,  $h^{-1}$  must be set in the chambers.

#### 4.2.2.2

The device to be tested is placed in the emission test chamber with sufficient paper and toner on 3 times air exchange before the emission test. Measurements of the internal atmospheric conditions are recorded from the start of this conditioning phase

#### 4.2.2.3

The device to be tested is placed in the emission test chamber for one hour in pre-operating phase. Ozone, VOCs, benzene and styrene measurements begin 20 minutes before the end of the pre-operating phase.

#### 4.2.2.4

After starting printing, the moment that the first page is printed is the beginning time of copying phase and the moment that the last page is printed is the finishing time of copying phase. Copying/Printing phase should be continued at least 10 minutes.

#### 4.2.2.5

VOCs, benzene and styrene measurements should be continued during Copying/Printing phase and 1 time of air exchange after Copying/Printing phase

#### 4.2.2.6

Ozone emission measurements should be continued during Copying/Printing phase and should be lasted enough until the time when Ozone half-life is calculated after copying.

#### 4.2.2.7

Dust emission measurements should be continued during Copying/Printing phase and be lasted at least 4 times after copying.

#### 4.2.2.8

Measurements are conducted at the outlet of chamber.

#### 4.2.3

Operating condition

##### 4.2.3.1

The testing device is placed in the emission test chamber with sufficient paper and toner

##### 4.2.3.2

The information and model of toner used in test should be recorded in the test report.

##### 4.2.3.2

Use A4-sized printing paper which Basis Weight is 60~80 g/m<sup>2</sup>.

##### 4.2.3.3

A printing pattern shall be used as defined in 'RAL-UZ 122 Appendix 2'.

#### 4.2.4

Calculation of the test result should followed the way defined in 'RAL-UZ 122 Appendix 2'

#### 4.2.5

If necessary, the test method may be changed within the range of not affecting much to the test result. However, the changed test method shall be approved by deliberation committee of eco-label certification.

### **4.3 Test method for measuring the noise emission (sound pressure level)**

#### 4.3.1

Test for noise emission shall be conducted with the following condition in accordance with KS I ISO 1996-1 (Acoustics - Description, measurement and assessment of acoustics - Description, measurement and assessment of environment noise - Part 1: Basic quantities and assessment procedures).A sound level meter specified in KS C 1502 (Sound level meters) shall be used, and the noise emission shall be determined in accordance with the weighting network A.

#### 4.3.2

The measurement of noise emission shall be taken 1m from the center of the flank sides, front side and back side of the product. It is indicated as the maximum level among the values measured at each measuring point. In case the fluctuation of the noise level is too large to determine a single value of measurements, equivalent continuous noise level can be used.

#### 4.3.3

If the noise emission is measured in a non-anechoic room, the distance between walls and the tested product shall be broad enough not to create reflecting sounds. A gap between background noise and measured noise shall be at least more than 10 dB(A).

#### 4.3.4

Noise emission at the printing phase shall be measured at the maximum printing speed under the continuous printing operation.

#### 4.3.5

Noise emission at the standby mode shall be measured before entering the power-saving mode after the last hard print output was completed.

### **4.4 Compliance verification and test method regarding the control of hazardous substances**

#### 4.4.1 Verification method for the hazardous substance management system

Note) This is the method to verify the compliance with the requirement of the restriction of the use of lead, cadmium, mercury and their compounds, and hexavalent chromium compounds in the parts of the product. This method is applicable to verify that the applicant properly controls PBBs (polybrominated biphenyls), PBDEs (polybromodiphenyl ethers) and short-chain chlorinated paraffins (C=10~13).

##### 4.4.1.1

Compliance verification shall be done by one of the following documents or more.

a) Explanatory note on the management system, established by the manufacturer on purpose to control the hazardous substances when each part of the product is supplied from the suppliers, and relevant documents

b) Test result conducted by the manufacturer in order to control the hazardous substances when each part of the product is supplied from the suppliers (In this case, test method including pre-conditioning method applied shall be specified in detail)

c) Certificate issued by the accredited third party showing that each part of the product satisfies the relevant requirements (e.g. Certificate of Korea Eco-Label according to 'EL 763. Electric and Electronic Parts')

d) Other documents showing that the manufacturer properly controls the hazardous substances when each part of the product is supplied from the suppliers.

#### 4.4.1.2

In case the compliance of the management system cannot be verified by '4.4.1.1' or the test result for specific parts of the product is required by deliberation committee of eco-label certification, compliance verification shall be done by the following '4.4.2 Test method for measuring the content of the hazardous substances' for the parts collected at random by eco-label certification body.

#### 4.4.2

Test method for measuring the content of the hazardous substances

Note) This is one of the test methods applicable to verify the content of lead (Pb), cadmium (Cd), mercury (Hg) and hexavalent chromium ( $\text{Cr}^{+6}$ ) contained in the parts of the product. The content of the hazardous substances can be also verified according to the internationally recognized test methods. In this case, test method including pre-conditioning method shall be specified in detail and the specified test method shall be approved by deliberation committee of eco-label certification.

##### 4.4.2.1

Test samples shall be homogenized by pre-conditioning method such as pulverization of each part.

##### 4.4.2.2

Analysis method of lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium ( $\text{Cr}^{+6}$ ), total chromium (Cr)

a) lead (Pb), cadmium (Cd): KS M 0016 (General rules for atomic absorption

spectrochemical analysis), KS M 0032 (General rules for ICP emission spectrochemical analysis) and Inductively coupled plasma mass spectrometry (ICP-MS)

b) mercury (Hg): Atomic absorption spectrochemical analysis by using gold amalgamation method and KS M 0016 (General rules for atomic absorption spectrochemical analysis)

c) hexavalent chromium ( $\text{Cr}^{+6}$ ): Ultraviolet spectrophotometric analysis by diphenylcarbazide and Ultraviolet spectrophotometric analysis by lead acetate trihydrate

d) total chromium (Cr): KS M 0016 (General rules for atomic absorption spectrochemical analysis), KS M 0032 (General rules for ICP emission spectrochemical analysis) and Inductively coupled plasma mass spectrometry (ICP-MS)

## **5. Reasons for Certification**

"Power-saving, low noise, low ozone emission(confirmed to applicable product), less indoor air pollutants(confirmed to applicable product)"

**<Attachment > Subject excluded from applying usage limit of harmful substances [3.1.4 of '3.1 Environmental Criteria' related]**

Note) This <Attachment> is modified and organized in order to apply the annex of EU guideline 2002/95/EC to this certification criteria. In case EU guideline 2002/95/EC is revised, it follows the revised EU guideline applied at the point of applying for certification.

Classification		Subject
Harmful Elements	Lead(Pb)	<ul style="list-style-type: none"> <li>▪ Lead contained in glass used in CRT, electronic parts, and fluorescent tube.</li> <li>▪ Lead of weight percentage below 0.35 contained in iron as the element of alloy.</li> <li>▪ Lead of weight percentage below 0.35 contained in iron as the element of alloy.</li> <li>▪ Lead of weight percentage below 4 contained in copper alloy.</li> <li>▪ Lead contained in high temperature fusible solder. (ex: tin contained in lead with over 85 weight percentage- lead solder alloy)</li> <li>▪ Lead contained in solder used in servers, memory devices, and memory device arrangement systems(applied up to 2010)</li> <li>▪ Lead contained in solder used in network infrastructure for conversion, signal, and transmission like network management for telecommunication.</li> <li>▪ Lead contained in incandescent lamp</li> <li>▪ Lead contained in electronic ceramic parts (ex: piezoelectric parts)</li> </ul>
	Mercury(Hg)	<ul style="list-style-type: none"> <li>▪ 5 mg or less of mercury contained in compact fluorescent lamp</li> <li>▪ Mercury contained in straight fluorescent lamp for general use. <ul style="list-style-type: none"> <li>- Halophosphate fluorescent lamp : below 10 mg</li> <li>- Average life triphosphate fluorescent lamp : below 5 mg</li> <li>- Long life triphosphate fluorescent lamp : below 8 mg</li> </ul> </li> <li>▪ Mercury contained in straight fluorescent lamp for special use</li> <li>▪ Mercury contained in other lamps not specifically designated in the excluded items.</li> </ul>
	Cadmium(Cd)	<ul style="list-style-type: none"> <li>▪ Cadmium alloy except items relevant to EU guideline 91/338/EEC</li> </ul>
	Chromium 6 (Cr <sup>+6</sup> )	<ul style="list-style-type: none"> <li>▪ Hexavalent chromium as an anti-corrosive of carbon steel cooling system in absorption refrigerators</li> </ul>
PBBs & PBDEs		<ul style="list-style-type: none"> <li>▪ Use of deca BDE as PBDEs.</li> </ul>

## **Common Criteria, Notice No. 2012-36, the Ministry of Environment**

1. Eco-label products must follow the following provisions with regard to the proper treatment of environmental pollution substances, such as air and water wastes and noxious chemical substances emitted in the process of manufacturing or service operation.

A. When first applying for certification, the product manufacturer should observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located for a period of one year prior to the date of application. Any case of violation of the penalty clause will be verified by confirming documents involved during a period of one year to the date of application. Regarding any violation not related to the penalty clause, confirmation will be made on the completion of appropriate measures.

B. A person who has received a certification of eco-labeling shall observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located during the period of certification. However, regarding any violation besides a penalty, confirmation will be made on the completion of appropriate measures.

2. As a general rule, information for consumers shall be indicated on the surface of the product in such a way not to be easily erased. However, in case that indication on the surface of the product is impossible or undesirable, it can be indicated on the appropriate part such as product packaging, product guidebook and user's manual that consumers can recognize. However, the service information should be indicated inside and outside of the place of service operation. In case that indication inside and outside of the place of service operation is impossible or undesirable, it can be indicated on the appropriate part such as an agreement, letter of delivery, letter of guarantee, and PR materials that consumers can recognize.

3. In order to establish fair trade and to protect consumer, the applicant for eco-label and the holder of eco-label license shall observe the Act on the Fairness of



Indication and Advertisement with respect to the environmental aspects of the product.

4. For Various standards referred in the certification criteria by target product, the latest revised edition applies at the date of application, if not specified otherwise.

5. In applying the quality related criteria for each target product, if no standard is available that can be applied as the quality criteria, the president of Korea Environmental Industry & Technology Institute (KEITI) (hereafter referred to as "president of KEITI") may establish and operate the quality criteria for the product involved after review by a competent committee.