

EL209. General Purpose LED Lamps

[EL209-2008/2/2012-36]



1. Scope

These criteria generally shall apply to LED lamps using internal converter and LED lamps using external converter, and which is used by directly connecting to a commercial power source, where the LED lamp is used for the purpose of substituting for an incandescent lamp, a fluorescent lamp, a halogen lamp, or a lamp for street lighting.

2. Definitions

2.1

“LED lamps using internal converter” refers to an LED lamp in which the converter (driving unit) and the LED lamp can be separated without damage, as these parts are integrated in a single body. KS C 7651 (LED lamps using internal converter - Safety and performance requirements) should be followed.

2.2

“LED lamps using external converter” refers to a single cap LED lamp in which the converter (driving unit) and the LED lamp can be separated. KS C 7652 (LED lamps using external converter - Safety and performance requirements) should be followed.

2.3

“Lamp for general lighting” refers to lighting apparatus not designed for a specific purpose, and should adhere to the definitions of KS C 8000 (General Rules of Lighting Apparatus).

2.4

“Luminance efficiency” refers to a value $[lm/W]$ obtained by dividing rating lamp power $[W]$ into an initial characteristic total luminous flux $[lm]$.

2.5

“Lumen maintenance” refers to a value represented by a percentage after dividing an

initial characteristic total luminous flux into a total luminous flux in a given time during the lifespan of a lamp.

2.6

“Initial characteristics” refer to optical and electrical characteristics, including power, current, voltage, and total luminous flux, in regard to a lamp in which aging is executed for 100 hours.

3. Certification Criteria

3.1 Environmental Criteria

3.1.1

With respect to the use of chemical substances in the course of manufacturing or recycling components at the stage of scrapping, the following criteria shall be complied with.

Note) These criteria are not applied to the excluded objects in the limitation of the use of harmful substances or to the soldering of printed circuit boards in accordance with EU Guideline 2002/95/EC, which is applied at the time of certification application.

3.1.1.1

With respect to lead (Pb), cadmium (Cd), mercury (Hg), and hexavalent chromium (Cr⁶⁺) contained in a product-constructed component, the product should comply with any one of the following.

3.1.1.1.1

A proper management system should be established and conducted so that harmful substances contained in a product-constructed component satisfy the following criteria.

Item	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Hexavalent Chromium (Cr ⁶⁺)
Criteria[mg/kg]	≤1000	≤100	≤1000	≤1000

3.1.1.1.2

Where a proper management system for relevant harmful substances is not established, harmful substances contained in a product-constructed component shall satisfy the following criteria.

Item	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Hexavalent Chromium (Cr ⁶⁺)
Criteria [mg/kg]	≤1000	≤100	≤1000	≤1000

Note) Where the total content of chromium (Cr) is 1000 or below 1000 mg/kg, it shall be deemed as having met the criteria.

3.1.1.2

Polybrominated biphenyls (PBBs), polybrominated diphenylethers (PBDEs), and short-chain chlorinated paraffins (C=10 to 13) with 50% chlorine or above 50% chlorine should not be used in products.

3.1.1.3

Halogenated synthetic resins, e.g., polyvinyl chloride (PVC), should not be used for synthetic resin components at amounts of 25g or above 25g when used for the housing of a product, and synthetic resin should not include a halogen compound. However, an organic fluorine additive, e.g., anti-dripping agent, representing 0.5% or below 0.5% in total weight, is permitted.

3.1.2

With respect to recycling in the course of manufacturing or recycling a product during the scrapping stage, a synthetic resin with a weight of 25g or above 25 g, and of which the area is 200 mm² or above 200 mm², should have a material classification indication on each divided portion in order to easily be classified and collected upon scrapping.

3.1.3

During the stage of use, the following criteria shall be adhered to with respect to energy consumption, etc.

3.1.3.1

Lamp luminance efficiency should satisfy the following criteria by product and color temperature.

Product	Color temperature(K)	Luminance efficiency(lm/W)
LED lamps using internal converter	≤5000	70
	>5000	65
LED lamps using external converter	≤5000	65
	>5000	60

Note: "5,000K color temperature of the product" means that the product has the range of 5028±283K color temperature according to KS C 7651 and KS C 7652.

3.1.3.2

The increase of the temperature of main components in a product shall not exceed the following value.

Main components of product	Increased temperature (K)
LED lamp base	≤90
LED lamp housing	≤70
LED lamp radiator	≤70
LED lamp illuminant surface	≤60

Note) The standard ambient temperature shall be 25°C.

3.1.3.3

In order to prevent glare, in the use of a backlight unit such as a glove or a reflecting plate, there shall be provided a structure that the light from the light sources (LED or LED module) does not emit directly to a user. However, LED lamps used for local lighting and used inside of outdoor lighting fixtures should be excluded.

3.1.4

With respect to the emission of waste at the stage of use and scrapping, the following criteria shall be complied with.

3.1.4.1

The durability of switching operation in a product shall be 50,000 or above 50,000.

3.1.4.2

The replacement and reassembly of individual LEDs and main components shall be easily executed.

3.1.4.3

Providing components and an after-sales service system shall be established in order to replace the LED or main components in preparation for product failure or breakdown.

3.2 Quality Criteria

3.2.1

LED lamps using internal converter should satisfy the safety and performance requirements specified in KS C 7651 (LED lamps using internal converter - Safety and performance requirements).

3.2.2

LED lamps using external converter should satisfy the safety and performance requirements specified in KS C 7651 (LED lamps using external converter - Safety and performance requirements).

3.3 Information for Consumers

3.3.1

Indication on product characteristic information, such as rated input voltage, rating lamp power, luminance efficiency, power factor, light source color, product for local lighting, shall be easily viewed. However, the rating lamp power and the power factor shall be indicated by $\pm 5\%$ of a test result value or below $\pm 5\%$.

3.3.2

Labeling of matters in which a product contributes to the certification reasons, (less harmful substances, energy-saving, less waste).

4. Test Methods

Certification Criteria			Test method and verification method
Environmental Criteria	3.1.1	3.1.1.1	Submitted documents and Test reports of authorized institutions pursuant to 4.2 certification and test method
		3.1.1.2~ 3.1.1.3	Verification of submitted documents
	3.1.2		Verification of submitted documents and fields
	3.1.3	3.1.3.1~ 3.1.3.2	The test results of the officially recognized agency, according to KS C 7651 (LED lamps using internal converter - Safety and performance requirements) or KS C 7652 (LED lamps using external converter - Safety and performance requirements).
		3.1.3.3	Verification of submitted documents and fields

	3.1.4	3.1.4.1	Submitted documents and test report conducted by an accredited testing laboratory in accordance with '4.1 and 4.3 certification and test methods'
		3.1.4.2	Verification of submitted documents and fields
		3.1.4.3	Verification of submitted documents
Quality Criteria	3.2.1		The test results of the officially recognized agency, according to KS C 7651 (LED lamps using internal converter - Safety and performance requirements) or the certificate for a higher standard.
	3.2.2		The test results of the officially recognized agency, according to KS C 7652 (LED lamps using external converter - Safety and performance requirements) or the certificate for a higher standard.
Consumer Information			Verification of submitted documents

4.1 General Matters

4.1.1

Make it a principle to take two test samples per product under application.

4.1.2

Environmental labeling certification institutions shall conduct random sampling of test samples among the products commercially available or kept in production locations.

4.1.3

The final evaluation of the test result for each sample shall be fully suitable for certification standard.

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 Appropriateness verification and test methods for use limitation criteria of harmful elements

4.2.1

Establishment, operation, and verification method for a proper management system for harmful elements.

Note) The objective of this method is to verify the appropriateness in terms of the criteria limiting the use of the following, such as lead, cadmium, mercury, their compounds, and hexavalent chromium in a product-constructed component. This method can be used for verifying that besides harmful elements, the management of PBBs, PBDEs, and short-chain chlorinated paraffins (C=10 to13), is properly executed.

4.2.1.1

The verification of appropriateness shall be executed by confirming one or more of the following documents a) to d) or by a test result.

a) Description and associated documents pertaining to the management system prepared to properly manage a corresponding harmful element when a product maker receives components from a component provider

b) Test results for the proper management of a corresponding harmful element when a product maker receives components from a component provider. (In this case, a concrete test method, including a preprocessing method, shall be applied to the test and fully described.)

c) Certification issued by a third party accredited testing laboratory capable of verifying that the product-constructed component is suitable for the corresponding certification criteria, e.g., certification of environment mark on components (EL763) used for electrical and electronic products out of the certification criteria for each environment mark-targeted product

d) Other data capable of verifying that a corresponding harmful element is properly managed when a product maker receives components from a component provider

4.2.1.2

Where it is difficult to determine whether the management system for harmful elements in accordance with 4.2.1.1, is properly operated or not, or where the Environment Mark Certification Deliberation Committee requires the test results of a specific component, the verification of a component sampled at random by the Environment Mark Certification Entrusted Agency shall be executed according to the following. '2.2. Harmful Element Content Test Method'.

4.2.2. Harmful Element Content Test Method

Note) This method is an example of test methods verifying the content of lead (Pb), cadmium (Cd), mercury (Hg), and hexavalent chromium (Cr^{6+}) contained in a product-constructed component. Besides this method, the content thereof may be verified through an objective test method that is internationally accepted. In this case, a concrete test method, including a preprocessing method, shall be described and the appropriateness of the described test method shall be determined after the deliberation of the Environment Mark Certification Deliberation Committee.

4.2.2.1

The sample for which content will be analyzed shall be a homogeneous material passing through the stage of disintegration for each basic unit.

4.2.2.2

Analysis methods for lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr^{6+}), and total chromium (Cr)

a) Lead (Pb) and Cadmium (Cd): KS M 0016 (general rules for atomic absorption spectrochemical analysis), KS M 0032 (general rules for ICP emission spectrochemical analysis), and ICP mass spectrometry (ICP-MS)

b) Mercury (Hg): Atomic absorption spectrochemical analysis by heat evaporation gold amalgamating, and KS M 0016 (general rules for atomic absorption spectrochemical analysis)

c) Hexavalent Chromium (Cr^{6+}): Ultraviolet spectrophotometric analysis by the diphenylcarbazide method, and Ultraviolet spectrophotometric analysis by the lead acetate trihydrate method

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 ICP mass spectrometry (ICP-MS)

4.3. Test Method for the Durability of Switching Operation

4.3.1. Upon testing, ambient temperature shall be 30 °C.

4.3.2. The test circuit shall be constructed identically to the normal operating status of the test sample.

4.3.3. The manipulation providing that the lamp is switched on for 10 seconds and off for 5 seconds after applying a rated power source to a test-targeted lamp shall be executed 50,000 times.

4.3.4. After executing 50,000 tests, the lamp shall exhibit no failure in operation and shall be normally switched on or off.

5. Reasons for Certification:

“Less harmful substances, Energy-Saving, Less waste”

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.