

## **EL210. LED Fixture**

[EL210-2011/5/2015-5]



### **1. Scope**

The criteria apply to the products that use the LED module using external converter, such as flood light, tunnel light, encased lighting fixtures, fixed lighting fixtures, street lighting fixtures and security lighting fixtures that directly connect to a commercial power source with LED as the light source. This criteria shall also apply to those products that have the function to turn on the lamp automatically by sensing the level of ambient light or the presence or motion of a human or other objects, and to turn off the lamp when the on-conditions are cleared.

### **2. Definitions**

#### 2.1

“Encased Lighting Fixture” means that a certain part of the lighting fixture is installed in a groove after forming a groove by lighting fixture size in a place for fixing the lighting fixture, such as on a ceiling or wall.

#### 2.2

“Fixed Lighting Fixture” means that the lighting fixture is directly installed in the place, such as on a ceiling or wall.

#### 2.3

“Flood Light” refers to a type of light fixture that concentrates the light in a certain direction.

#### 2.4

“Tunnel Light” refers to a type of light fixture that is mainly installed in road tunnels for the purpose of providing safety to vehicle drivers.

#### 2.5

“Luminance efficiency” refers to the value of initial characteristics of total luminous flux [lm] divided by the lamp input power [W].

## 2.6

“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.

## 2.7

“Human body sensing type” refers to a type of product that turns on the lamp when the ambient light level drops below a specified threshold and the presence or motion of a human (including other lifeforms such as animals) is sensed. This type of light fixture can be classified into ‘one shot sensing type,’ which turns off the lamp after a specified period of time irrespective of the object sensing conditions once the lamp is turned on, and ‘continuous sensing type,’ which keeps the lamp on while the detected target is present.

## 2.8

“Object sensing type” refers to a type of product that turns on the lamp when the ambient light level drops below a specified threshold and the motion of an object (including a human body) is sensed, and this type of light fixture is classified into ‘one shot sensing type’ and ‘continuous sensing type.’

## 2.9

“Ambient light threshold” refers to a threshold value of the ambient light level that is used to make a decision regarding whether to turn the lamp on or off.

## 2.10

“Sensing range” refers to a range in space in which the presence or motion of sensing targets such as lifeforms or objects can be detected, and it may be expressed as the angle in reference to the vertical axis of the sensor or the distance on a flat surface that is perpendicular to the sensor axis and is separated by a specified distance at the usual installation height.

## 2.11

“Lamp on hold time” refers to the time interval measured from the moment at which the lamp is turned on by sensing the target object until it is turned off automatically.

### **3. Certification Criteria**

### 3.1 Environmental Criteria

#### 3.1.1

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

Note) The criteria shall not be applied to specific products that are exempt from the harmful substance restriction in accordance with Annex III of the EU guideline 2011/65/EU or 「Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles」. In the event that EU Guideline 2011/65/EU or 「Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles」 is revised, the revised guidelines or requirements in the law that are effective at the time of the application of certification shall be applied.

##### 3.1.1.1

The following substances shall not be used in the product.

- a) Lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr<sup>6+</sup>) or compounds containing one of these substances
- b) PBBs (polybrominated biphenyls), PBDEs (polybromodiphenyl ethers) or short-chain chlorinated paraffin (C=10~13) with a chlorine concentration of chlorine over 50%.

##### 3.1.1.2

Content of harmful substances in the product such as lead, cadmium, mercury and hexavalent chromium shall meet the following requirements. The requirement is considered as having been satisfied if the applicant has implemented and operated proper system to control these substances.

Substance	Pb	Cd	Hg	Cr <sup>6+</sup> (note)
Content [mg/kg]	≤ 1 000	≤ 100	≤ 1 000	≤ 1 000

Note) The requirement is considered as having been satisfied if the total content of chromium (Cr) is below 1,000 mg/kg.

##### 3.1.1.3

Halogenated plastics such as PVC shall not be used for the plastic case parts weighing 25 g or more, and also halogenated compounds shall not be contained in the plastic

parts. Exempted from this criterion are the organ fluorine additives with less than 0.5 wt% (e.g. anti-dripping).

### 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 25 g or above 25 g, and of which the area is 200 mm<sup>2</sup> or above 200 mm<sup>2</sup> should have a material classification indication on each divided portion in order to easily be classified and collected upon scrapping.

### 3.1.3

The luminance efficiency of a lamp shall meet the appropriate certification criteria of the provisions on supply and promotion of high efficiency energy equipment in accordance with the Energy Retrofit Act.

### 3.1.4

The lifespan of a product at the stage of use shall meet the criteria for luminous maintenance specified in Korean Industrial Standards. If luminaries are produced by using LED sources that have acquired the “EL211. LED Source Package and Module” certification and the measurement results in accordance with “EM701. In Situ Temperature Measurement Test for LED Luminaires” satisfy the certified conditions of the light source in question, however, the product shall be regarded as appropriate in regard to the criteria for luminous maintenance.

### 3.1.5

With respect to discharge of waste in manufacturing and scrapping process, following requirements shall be satisfied.

#### 3.1.5.1

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

#### 3.1.5.2

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.

#### 3.1.5.3

The ambient light threshold to turn on an ambient light sensing type of lamp shall not exceed 10 lux, and the capability to adjust it over 20 lux shall be prohibited if the product has the function to adjust the value. The accuracy of the threshold of human

and object sensing type light fixture shall be within  $\pm 10\%$  of the value specified by the applicant, and the threshold shall be adjustable to the range specified by the applicant if the product has the function to adjust the value.

Note) The maximum threshold for the human and object sensing type shall not exceed 20 lux unless there is a valid reason to do so.

#### 3.1.5.4

Recyclability, reduction of waste, and environmental hazard shall be considered in the manufacturing of the product's packaging. Individual packing buffer material of the product shall meet one of the following requirements, and shall consist of a single material.

- a) Recycled paper/pulp material such as pulp mold
- b) Packing buffer material that is E-mark certified in accordance with EL606 (Packaging Material)
- c) Packaging material that is manufactured with over 50 weight % of recycled synthetic resin
- d) Packing material made of foam synthetic resin (EPS, EPE, EPP) that is manufactured using a substance with ODP of 0 as a foaming agent
- e) Air cell packing buffer material made of air injected synthetic resin material

### 3.2 Quality Criteria

#### 3.2.1

Product shall meet the requirements specified in "Safety Criteria of Electric Appliances" in accordance with the Electric Appliances Safety Control Act.

#### 3.2.2

Color rendition should be over 75.

#### 3.2.3

The quality of the product shall meet the requirements specified in the Korean Standards applicable to the product, with the exception of the color rendition requirement and the criteria specified in the '3.1 Environmental Criteria.'

#### 3.2.4

Light fixture with sensing function shall meet the requirements specified in 3.2.1 and 3.2.2, as well as the following requirements.

#### 3.2.4.1

Human body and object sensing type products shall sense the target and turn on the lamp when the target object is approached to within 90% of the maximum sensing range.

#### 3.2.4.2

The lamp on hold time of a one shot sensing type light fixture shall be in the range between 10 seconds and 60 seconds. However, if the product has the function to adjust the lamp on hold time, the user shall not have the capability to adjust it to more than 120 seconds.

#### 3.2.4.3

Continuous sensing type light fixture shall maintain the lamp as on while the detected target is present within the sensing range, and the lamp on hold time after target is out of the sensing range shall meet the requirements specified in 3.2.4.2.

Note) For an object sensing type light fixture that turns off the lamp when no movement of the target is sensed during the period of time specified by the applicant, the lamp on hold condition is considered to have been maintained. However, the error margin for the time limit specified by the applicant shall not exceed  $\pm 10\%$ .

### **3.3 Information for Consumers**

#### 3.3.1

Mark related to the items that contribute to the reasons for certification (reduction of harmful substance, energy saving, reduction of waste) while the product is used.

Example) Features related to quality and safety, such as power consumption efficiency or elimination of harmful substances

#### 3.3.2

Mark providing information about product characteristics

##### 3.3.2.1

Mark for the product's features, including the rated input voltage, rated power, light

efficiency, power factor and light color. However, the rated lighting fixture's power and power factor must be included within  $\pm 5\%$  of the testing result.

### 3.3.2.2

Rating (voltage and current) of converter and LED module

### 3.3.2.3

Proper installation location and cautions during installation (applicable to sensing type light fixture only)

### 3.3.2.4

Mark for maximum sensing range and ambient light threshold (applicable to sensing type light fixture only)

### 3.3.2.5

Product's rated lifespan (or guarantee lifespan) and ground of it.

## 4. Test Method

Certification Criteria			Test and verification method
Environmental Criteria	3.1.1.1	a)	Verification of the submitted document
		b)	
	3.1.1	3.1.1.2	Submission of document in accordance with “(2) Verification and Test Method”
		3.1.1.3	Verification of the submitted document.
		3.1.2	Verification of submitted documents
	3.1.3	Test report issued by an accredited testing laboratory in accordance with the applicable requirement in the “Provisions Concerning Supply Promotion of High Efficiency Energy Equipment”, or a certificate of another equivalent or higher standards.	
3.1.4	<ul style="list-style-type: none"> <li>■ Test report issued by an accredited testing laboratory in accordance with the Korean Standards that are applicable to the product, or certificate of equivalent or higher standard.</li> <li>■ Or a certificate in accordance with ‘EL211. LED Light Source Package and Module’ and</li> </ul>		

		a test report by an accredited testing laboratory on 'EM701. In Situ Temperature Measurement Test for LED Luminaires'
	3.1.5	3.1.5.1 Test report by an accredited testing laboratory in accordance with '4.1 and 4.3 test method'
		3.1.5.2 Verification of submitted documents
		3.1.5.3 Test report by an accredited testing laboratory in accordance with '4.1 and 4.4 test method'
	3.1.6 Verification of submitted documents	
Quality Criteria	3.2.1 Test report issued by an accredited testing laboratory in accordance with the "Safety Criteria of Electric Appliances", or certificate of equivalent or higher standards.	
	3.2.2 ~ 3.2.3 Verification of submitted document or test report issued by an accredited testing laboratory in accordance with the applicable Korean Standards.	
	3.2.4	3.2.4.1 Test report issued by an accredited testing laboratory in accordance with the test methods in 4.1 and 4.5.
		3.2.4.2 ~ 3.2.4.3 Test report issued by an accredited testing laboratory in accordance with the test methods in 4.1 and 4.6.
Consumer Information		Verification of submitted documents

Note) If the criteria described above overlaps with an equivalent or higher criteria, either criteria can be applied.

## 4.1 General Matters

### 4.1.1

Two test samples shall be required for each applied product.

### 4.1.2

Eco-labeling certification institutions shall conduct random sampling of test samples among the products commercially available or kept in production locations. However, where it is impossible to collect the samples at random, a sample provided by a manufacturer may be used as a test sample.



#### 4.1.3

Both of the two test samples shall meet the certification criteria from the final evaluation for the test results.

#### 4.1.4

Measurements of any testing shall be conducted when the product reaches steady state after the product is installed and power is applied, and the ambient temperature and relative humidity during the test shall be maintained as  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and  $(60 \pm 20)\%$ , respectively, as a general rule.

#### 4.1.5

If the effects of the lamp cannot be ignored, a maximum rated lamp of the appropriate type, which is specified in the product or user's manual, shall be used as a reference, while the maximum rated lamp that can be used with the product shall be attached if there is no specific mark. If the effects of the lamp can be ignored, however, the lamp specified by the applicant shall be used as a reference.

#### 4.1.6

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

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

#### 4.2.1

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 (polybrominated diphenyl ethers) and short-chain chlorinated paraffins (C=10~13).

##### 4.2.1.1

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. E-mark certificate certified as 'Electrical and Electronic Product (EL763),' one of the target-specific certification criteria.)
- d) Other documents showing that the manufacturer properly controls the hazardous substances when each part of the product is supplied from the suppliers.

#### 4.2.1.2

In case the compliance of the management system cannot be verified by '4.3.1.1' 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 '4.3.2 Test method for measuring the content of the hazardous substances' for the parts collected at random by eco-label certification body.

#### 4.2.2

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.

##### 4.2.2.1

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

##### 4.2.2.2

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)

### **4.3 Test method of durability of ballast flasher**

#### 4.3.1

Ambient temperature shall be 30 °C while test is being performed.

#### 4.3.2

The test circuit shall be constructed in a manner equivalent to the normal operating status of the test sample.

#### 4.3.3

Turn the lamp on for 10 seconds and off for 10 seconds which constitute one cycle of the test and repeat the cycle 50 000 times.

Note) Sensing type light fixture shall be turned on and off based on the sensor operation as a general rule. However, this requirement may be waived if the durability of the sensor and switch for over 50,000 operations can be objectively proved.

#### 4.3.4

When the test ballast is connected to the light fixture after 50,000 of on-off test, it shall be lighted on without any malfunction.

### **4.4 Test method of ambient light threshold of sensing type light fixture**

#### 4.4.1

Test shall be conducted in a place where the test is not affected by external light sources and the sensor is not directly affected by the change of illuminance caused by the lamp's operation.

#### 4.4.2

Measure the illuminance of ambient light when the lamp is turned on while reducing the ambient light level slowly. If necessary for accurate testing, sensor device can be separated for testing provided that the optical characteristics are not affected. For a product with a human or object sensing function, the applicable circuit shall be tuned in advance so that only the ambient light affects the testing.

#### 4.4.3

Measure the illuminance three times at a location close to the sensor, take the average and use it as the result.

### **4.5 Test method of sensing range for sensing type light fixture**

#### 4.5.1

Reference target sensing object (hereinafter referred to as "sensing object") for sensor testing shall be of a regular hexahedron structure with a size of about 30 cm. The sensing object for human sensing type light fixture shall be an object that emits far infrared rays like the human body, and an actual human can move in the test area as a sensing object if there is no objection to the decision with the test result.

Note) Example far infrared emitting object is to maintain the temperature of the sensing object at around 35°C.

#### 4.5.2

Light fixture shall be installed in normal use conditions, in which the geometric center of the light figure and the sensing object shall be approximately aligned. The distance between the sensor and the top side of the object standing vertically to the sensing surface of the light fixture shall be based on the value specified by the applicant as a reference.

Note) "The value specified by the applicant" is a value that approximately represents the distance between the light fixture and sensing object for the given average height of the sensing object and the installation height of the light fixture, which is specified by the applicant in normal use conditions.

#### 4.5.3

Measure the distance when the light is turned on while moving the test sample toward the geometric center of the test sample from the outside the sensing range, and express the sensing range as the radius or angle from the geometric center of the light fixture. However, the sensing object shall move along a virtual parallel line that is 2 meters away from the geometric center of the light fixture.

Note) The moving speed of the sensing object applied to the test for a human sensing type product shall be 50 cm/sec, and a higher speed equivalent to vehicle moving speed that is specified by the applicant shall be applied to the testing of the object sensing type product.

#### 4.5.4

The sensing range shall be measured in at least 8 directions at 45° intervals from the geometric center of the light fixture. The result shall be expressed as the average value taken from three repeated measurements.

### **4.6 Test method of lamp on hold time for sensing type light fixture**

#### 4.6.1

The test methods specified in 4.5 shall be applied, except for the following.

#### 4.6.2

The lamp on hold time of a one shot sensing type light fixture shall be tested by measuring the time interval from the moment at which the lamp is turned on by moving a sensing object into the sensing range until the lamp is turned off while the sensing object is still within the sensing range.

#### 4.6.3

The lamp on hold time of the continuous sensing type light fixture that turns off the lamp if no movement of any object is sensed for a specified period of time as it is considered as no movement condition, shall be tested by measuring the time interval from the moment at which the sensing object is out of the sensing range until the lamp is turned off, after making sure that the lamp is turned on when sensing object is within the sensing range and the lamp stays on while the sensing object stays within the range for longer than the specified period of time.

#### 4.6.4

For a light fixture that turns off the lamp when no movement is sensed for a specified fixed period of time as it is recognized as no movement condition, the time interval from the moment at which the sensing object stops moving until the lamp is turned off shall be measured and compared with the value specified by the applicant.

Note) For a light fixture that turns off the light when the sensing object does not move for a specified fixed period of time, the time interval from when the sensing object stops moving until the lamp is turned off shall be measured.

#### 4.6.5

The sensing range shall be measured in at least 8 directions at 45° intervals from the geometric center of the light fixture. The result shall be expressed as the average value of three measurements.

### **5. Certification Reasons**

“Reduction of harmful substances, Energy-saving, Reduction of wastes”