



**Green Label Product
LED lighting
(TGL – 86- R1 – 17)**

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**Green Label Criteria for LED lighting
(TGL-86-R1-17)
Prepared by
Sub-technical subcommittee No. 81
The Thai Green Label Scheme**

1. Introduction

Light Emitting Diode (LED) is the high efficiency lighting technologies. LED lightings and luminaires start playing a key role in global lighting industries and rapidly growing to replace the traditional lighting technologies in the future. Using LED lightings can be reduced energy consumption and reduce Climate change. However, a consideration of the life cycle assessment of LED lightings is being concerned, especially; on potential risks towards consumers during the use phases as well as environmental impacts from improper end-of-life treatment of LEDs are found.

Therefore, the Green Label for LED lightings has been developed to support consumers' decision making to choose a high quality and environmentally friendly LED, the terms and conditions for Thai Green Label certificate for LED are written concerning energy saving during use phase, encouraging the use of recycled materials, as well as chemical usage control in LED (i.e. halogenated compounds, heavy metals, flame retardants, etc.) in order to reduce contamination into the environment and impacts on human health. The Thai Green Label of LED lightings can give consumers a guarantee of quality and safety as well as reducing impacts to the environment.

2. Scope

These criteria shall apply to LED lamps and LED luminaires for general lighting purpose.

3. Definition

3.1 **LED Products** refers to LED lamps and LED luminaires.

3.2 **LED lamp** refers to LED light source with lamp terminals, consisting of one or several LED modules. It may contain other components such as part of Electrical, mechanical, thermal, contact and control devices.

Remarks

1. LEDs may be either integrated (LEDi) or semi-integrated (LEDsi) or not integrated (LEDni).

2. LED is including single pole and double pole types.

3. LED tube is designed to be replaced by any person. (defined in IEC 60050-826, 826.18.03)

3.3 **Integrated LED lamp** (LEDi) refers to LEDs incorporating control devices and other auxiliary components needed to ensure stable light sources. It is designed to be directly connected to the supply voltage.

3.4 **Semi-integrated LED lamp** (LEDsi) refers to LEDs with controls inside the control unit and operated by the power supply of the control device, which is separate.

- 3.5 **Non-integrated LED lamp** (LEDni) refers to LEDs that require separate controls for operation.
- 3.6 **LED luminaires** refers to electric light bulbs include light emitting diodes.²
- 3.7 **Luminaire refers to** finishing equipment that distributes, filters or converts light from single or multiple tubes and other parts which necessary for installation and protection of tubes, but excludes tubes and auxiliary equipment in the required circuits. This include how to connect to the power supply.³
- 3.8 **Certificate** refers to a document issued by a certification body, which has been accredited by the Office of the National Standardization Council (ONSC) or an accreditation body under International Accreditation Forum (IAF).
- 3.9 **Letter for declaration of compliance** refers to a document issued by the applicant or the manufacturer to ensure compliance with product environmental requirements for respective products.
- 3.10 **Authorized director** refers to the person who has been authorized to sign on behalf of a juristic person under Civil and Commercial code.

4. General criteria

- 4.1 Product shall be certified by the Thai Industrial Standard (TIS) for lighting and similar equipment: radio disturbance characteristics - limits (TIS 1955¹).

Verification method

The applicant shall submit the certificate of Thai Industrial Standard for lightings and similar equipment: radio disturbance limits (TIS 1955).

- 4.2 The LED luminaires product for street light shall comply with the requirements as follows:
- (1) Product shall be certified by the Thai Industrial Standard (TIS) 1955 for lighting and similar equipment: radio disturbance characteristics - limits.
 - (2) Product shall be certified by the Thai Industrial Standard (TIS) 2624 2(1) for Light Emitting Diodes - Features Required for Performance or IEC 62722-2-1² or other equivalent standards

Verification method

The applicant shall submit the following documents:

1. Certification of Thai Industrial Standard for lighting and similar equipment: radio disturbance characteristics - limits (TIS 1955).
2. Certification of Thai Industrial Standard for Light Emitting Diodes - Features Required for Performance (TIS 2624 2(1)) or IEC 62722-2-1 or other equivalent standards

¹ TIS 1955-2551: Lighting and similar equipment: radio disturbance limits.

² IEC 62722-2-1: Luminaire performance - Part 2-1: Particular requirements for LED luminaires.

- 4.3 Manufacturing, transportation, and post-industrial waste disposal shall comply with the national laws and regulations and the manufacturer shall be accredited by ISO 14001³

Verification Method

The applicant shall submit the following documents:

1. License or evidence to prove that manufacturing, transportation, and post-industrial waste disposal comply with national laws and regulations.
2. Certification of ISO 14001 from the manufacturer.

5. Environmental criteria

- 5.1 An Energy efficiency of product shall comply with the Energy Label No.5's standard guidelines defined by the Electricity Generating Authority of Thailand (EGAT), except for street lamp products.

Verification method

The applicant shall submit the Energy Label No.5⁴ certificate granted by the Electricity Generating Authority of Thailand (EGAT) or submit the test results certifying that they are in compliance with the Energy Label No.5's standard guideline.

- 5.2 Plastic parts of product shall contain heavy metals, heavy metal compounds and flame retardants as shown in Table 1⁵

Table 1 The regulatory standard for heavy metals, heavy metal compounds and flame retardants in homogenous materials

Substances	Heavy metals and heavy metal compounds				Flame retardants	
	Pb	Cd	Hg	Cr ⁶⁺ **	PBB	PBDE
Amount (mg/kg)	≤1000	≤100	≤1000	≤1000	≤1000	≤1000

Note: ** If total chromium (Cr) content is less than or equal to 1,000 mg/kg, the criteria for chromium hexavalent (Cr⁶⁺) content shall be considered

Verification method

1. If Hazardous Substance Process Management System is implemented, the applicant shall submit the proof evidences as following:

1.1 A compliance declaration letter from LED manufacturer certifying that heavy metals and flame retardants are not exceed the threshold limits as well as documents/evidences to proof that the procedure of Hazardous Substance Process Management System has been implemented in the factory.

1.2 A compliance declaration letter from Suppliers and/or the test results certifying

³ ISO 14001: Environmental Management System.

⁴ The Energy Label No.5, EGAT: LED lamp.

⁵ Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

that heavy metals and flame retardants are not exceed the threshold limits in accordance with IEC 62321 standard or other equivalent standards.

2. If Hazardous Substance Process Management System is implemented, the test results certifying that heavy metals and flame retardants are not exceed the threshold limits in accordance with IEC 62321⁶ standard or other equivalent standards.

Note: - Test result from laboratories that are not ISO / IEC 17025 accredited in the scope of testing is allowed within 3 years from the approval date of this criteria.

Remark : *In surveillance, Green Label personnel will be responsible for random sampling and testing to ensure compliance with requirement 5.2, while the applicant will be responsible for all incurring charges for testing.*

- 5.3 Short-chain chlorinated paraffins with average carbon chain lengths of 10–13 carbon atoms and a chlorine concentration of more than 50% shall not be added in the plastic parts of product.

Verification method

The applicant shall submit the declaration letter stating that no chloroparaffins added in the plastic parts of product according to Environmental criteria 5.3.

- 5.4 Plastic parts that are product's component shall meet the requirements of the halogen content according to Table 2

Table 2 The halogen content allowed in plastic parts.

Substances	Halogen		
	Chlorine (Cl)	Bromine (Br)	Total Halogens
Amount (mg/kg)	≤900	≤900	≤1500

Note: Halogen content is in accordance with IEC 61249-2-21⁷ standard

Verification method

The applicant shall submit the following documents:

1. A declaration letter indicating that the product has halogen content with specified content given in Table 2.
2. Test results confirming Chlorine content, Bromine content and total halogens in plastic parts are in accordance with BS EN 14582⁸ or other equivalent standards.

⁶International standard IEC 62321: Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers).

⁷ IEC 61249-2-21: Materials for printed boards and other interconnecting structures - Part 2-21: Reinforced base materials, clad and unclad - Non-halogenated epoxide woven E-glass reinforced laminated sheets of defined flammability (vertical burning test), copper-clad.

⁸ BS EN 14582: Characterization of waste. Halogen and sulfur content. Oxygen combustion in closed systems and determination methods.

- 5.5 Plastic parts weighing more than 25 g or having surface area more than 200 mm², shall have symbols indicating the type of plastic according to the Thai Industrial Standard: recycling plastic TIS 1310⁹, or have specify abbreviations indicating the type of plastic according to ISO 1043¹⁰ or ISO 11469¹¹

Verification method

The applicant shall submit a compliance declaration letter certifying that the notification symbol(s) indicator the type of plastic are shown on the plastic parts according to the Thai Industrial Standard: recycling plastics (TIS 1310-2538 (1995)) or have specify abbreviations indicating the type of plastic in according to ISO 1043 or ISO 11469. Samples and photographs of the mentioned packaging are also required for verification.

5.6 Packaging (if relevant)

5.6.1 Paper packaging for transportation shall comply either of the following requirements (individual package is excluding):

- (1) be certified to Thai Green Label criteria for paper packaging (TGL-104) or
- (2) be made from recycled pulp as specified in Table 3.

Table 3 Content of recycled pulp

Product categories	Content of recycled pulp (%by weight)
Shock-absorbing material	≥ 70
Tray	≥ 75
Cardboard box	≥ 70
Corrugated cardboard box	≥ 60
Mail envelope	≥ 20
Kraft paper bag	≥ 50
Molded products	≥ 90
Other packaging product	≥ 40

Verification method

The applicant shall submit either of the following evidences:

1. Certificate of Thai Green Label for paper packaging (TGL-104)
2. A declaration letter indicating that the paper packaging is made from recycled pulp with specified in Table 3. The declaration letter shall be stamped with the company hallmark and signed by authorized personnel of the paper packaging manufacturer.

5.6.2 Plastic packaging shall comply either of the following requirements:

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

⁹ TIS. 1310: Symbols for recycling plastics.

¹⁰ ISO 1043: Plastics –Symbols and abbreviated terms.

¹¹ ISO 11469: Plastics –Generic identification and marking of plastic products.

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

Verification method

The applicant shall submit either of the following evidences:

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

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

Note: Environmental criteria 5.6.3 shall be exempted in the case where the paper or plastic packaging has been certified to Thai Green Label.

Verification method

The applicant shall submit either of the following evidences:

1. The applicant who has test results from the manufacturer of paints or pigment shall submit the following evidence:
 - 1.1 A declaration letter indicating that the applicant has bought those paints or pigment from the refer manufacturer.
 - 1.2 A declaration letter from paints or pigment manufacturer indicating that paints or pigment are comply with the Environmental criteria 5.6.3 together with the test result of those paints or pigment according to IEC 62321 or other equivalent standards.
2. The applicant, who has sent the sample of packaging or label to test, shall submit the test results of those paints or pigment according to IEC 62321 or other equivalent standards.

6. Testing and certification

6.1 Testing

6.1.1 The laboratory shall be operated by the government or under governmental control as defined by clause 5 of the Industrial Standard Act B.E. 2511 (and its amendment) or certified to TIS 17025¹² or ISO/IEC 17025¹³ with relevant scope of accreditation.

6.1.2 Test report

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

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

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

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

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

6.2 Declaration letter to verify compliance with Green Label requirements

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

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

7. Next issues to consider

7.1 Plastic parts used in manufacturing process shall comply with the vertical burning test (V0) in accordance with UL94 or ISO 9773 or IEC 60695-11-10 or other equivalent standards.

¹² TIS 17025 General Requirements for the Competence of Testing and Calibration Laboratories.

¹³ ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories.