GREEN CHOICE PHILIPPINES

NELP-GCP PRP 2011005

LIGHT EMITTING DIODE (LED) FOR GENERAL LIGHTING

I. Environmental Scenario

For the past years lighting technology is continually evolving. Further developments in lighting system have mainly focused on improving lighting performance, and energy efficiency.

One of the earliest types of lighting is the incandescent lamp. Incandescent lamp creates light by passing electricity through a metal filament, when the filament becomes hot enough it glows. It uses large amount energy to produce light. Most of the energy is converted to heat. This is the reason why incandescent bulbs, also known as light bulbs, are warm when lighted. Consequently only a small amount of energy is converted as light. Lastly, incandescent light bulb has a shorter expected life span of 750 to 2500 hours.

The compact fluorescent lighting (CFL) was sought to be a good replacement for the incandescent bulbs. The system works when electricity passes through a tube containing gases where it triggers a reaction. This reaction produces ultraviolet light that is transformed into visible light by the phosphor coating inside the tube (solidstatelighting.org). Compared to ordinary incandescent bulbs, fluorescent light bulb has a longer life span of 7000 to 20000+ hours. Moreover, consumes less energy of about 50 to 80% compare to the common incandescent light bulb. Lastly, it is cooler than incandescent lamp. The problem with CFLs arises during its disposal period. Broken and burned out CFL tubes are considered as toxic and hazardous waste. For CFLs contains mercury, though in small amounts can be still toxic.

In Philippine context, around the year 2000 most of households that have access to electricity still uses the traditional lamps, T12 about 49% and 44% for Incandescent and still down at a low percentage are the CFLs (around 7%) and 0% for other alternative lighting systems. This is also true for the commercial establishments and the industries wherein around 42% and 48% percent respectively still use T12 and 38% and 26% for the industrial and commercial establishments uses HID-Mercury lamps. The environmental concern is if the large amount of mercury lamps are busted, surely and there's a high percentile of about 80% that it will go to the dumpsite (Ecowaste, undated) cause mercury leacheate that may seep through the soil entering our water supply. Similar to other heavy metals, mercury poisoning is a cause of many neuro-circulatory tract base diseases.

Claimed to address these was the solid state lighting system, one example of this is the LED. Compare to incandescent and fluorescent lamps,light emitting diode

(LED) consumes less energy and much cooler due to that most of the energy used to power the solid state LED is converted to light rather than heat which is a common by-product of lighting systems, thus saying its energy efficient.

II. Definition of Terms

1. **Light Emitting Diode (LED) –** Solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current.

2. **LED module –** unit supplied as a light source. In addition to one or more LEDs, it may contain further components, e.g. optical, mechanical, electrical and electronic but excluding the control gear.

3. **Self-ballasted LED module –** LED module, designed for connection to supply voltage.

4. **Self-ballasted lamp –** if the self-ballasted module is equipped with a lamp cap.

5. **VOC –** abbreviation stands for volatile organic compound. These are organic compounds that have low vapour pressure characteristics thus having high volatility. VOC are said to be toxic and harmful both for humans and the environment.

6. **Heavy metals -** metals with high relative atomic mass. The term is usually applied to common transition metals. These metals are a cause of environmental pollution (heavy-metal pollution) from a number of sources, including lead in petrol, industrial effluents, and leaching of metal ions from the soil into lakes and rivers by acid rain. *(Chemistry dictionary)*. These substances were now on strict observation from the government. Some example of these metals were cadmium, mercury, lead, hexavalent chromium, arsenic.

7. **NELP-GCP –**National Ecolabelling Programme-Green Choice Philippines

8. **PBB** –polybrominated biphenyls.

9. **PBBE** – abbreviation stands for polybrominated biphenyl ethers.

10. **Luminous Efficacy –** the value lumen per watts (lm/W) obtained by dividing rating lamp power, watts (W) into an initial characteristic total luminous flux, lumen (lm).

11. **General Lighting –** pertains to substantially uniform lighting of an area without provision for special local requirement.

12. **Local Lighting**- lighting for a specific visual task, additional to and controlled separately from the general lighting.

13. **ISO 17025**- General Requirements for the Competence of Calibration and Testing Laboratories

14. **IEC 62031**- LED Modules for general lighting for safety specifications

III. Scope

These criteria shall apply only to LED for general lighting purpose with the equal or less than 5 watts.

Green Choice Requirements

To carry the Green Choice Philippines seal, the product must meet the following requirements:

A. Product Quality Performance

Products shall be of high quality and perform well in their intended application. The product must ensure its suitability for its intended use and where relevance.

1. ***Luminous Efficacy*** of the module shall be:

Color Temperature	Luminous efficacy (lux/watt)
4,000K and below	≥7.5
Above 4,000K	≥10.5

2. ***Product durability*** the module shall have an expected life span of greater or equal to 40,000 lighting hours and this must be indicated in the packaging.

3. Durability of the switching operation in a product shall be greater than or equal to 50,000 times. The switching cycle shall be 30 seconds “ON” and 30 seconds “OFF”.

4. The product shall comply with the requirements of IEC 62031:2008(LED Modules for general lighting for safety specifications).

B. Environmental Performance

1. The applicant must comply with all applicable international and local environmental policies, laws and regulations.

2. The product shall comply with the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Directive 2002/95/EC). The product shall not contain more than 1000

ppm of lead (Pb), mercury (Hg), Hexavalent chromium (Cr^{6+}), Poly brominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE) and not more than 100 ppm of Cadmium (Cd) by weight of homogeneous material.

3. The packaging material for distribution (carton boxes and the like) shall be manufactured from at least 60% recycled material. Packaging material indicates the percent recycled content.

4. The product shall have a warranty period of greater than or equal to three years and clearly stated in the packaging.

5. The applicant shall have a disposal and retrieval program for the busted and end-of life product.

IV. Verification Methods

1. The product quality performance requirements can be validated by submitting test reports conducted by accredited laboratory or government recognized laboratory/ies.

2. The environmental performance requirements number 1 and 2 can be validated by all relevant environmental permits, licenses or certifications and by submission of test reports conducted by the third party accredited laboratory.

3. For the environmental requirement number 3, certification issued by the manufacturer of the packaging material stating that the packaging material used for the product is made of at least 60% recycled fiber.

4. The applicant shall submit the warranty statement signed by the President or authorized representative.

5. Submission of retrieval and disposal program for busted lamps.

V. Effectivity and Validity

These product criteria shall be in effect for three (3) years from the date of its approval, and are subject to change or withdrawal by the National Ecolabelling Programme of the Philippines Board when deemed necessary.

References

www.solidstatelighting.org

LED Modules for general lighting for safety specifications (IEC 62031:2008)

Singaporean Green Label SGLS 54-Solid State LED

Korean Green Label EL209-2008/1/2008-137-General Purpose LED lamps

International Electrotechnical Vocabulary 845-09-06

ANNEXES